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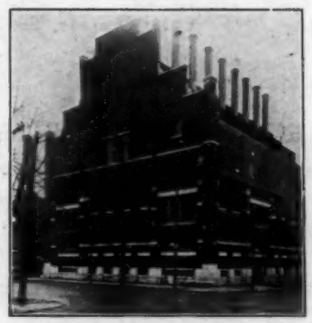

Toronto, Ont.
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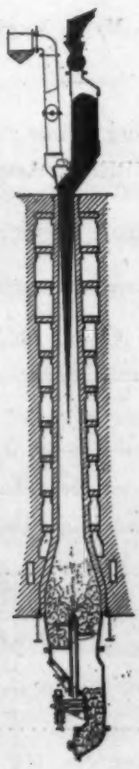

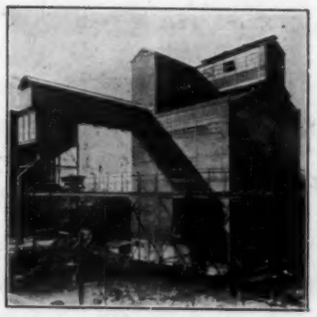

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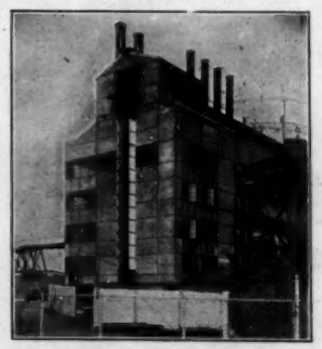

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SIXTY-SEVENTH YEAR

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AMERICAN
GAS JOURNAL

Established 1859— Pioneer of the Gas Industry

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Twenty Years in the Gas Business

How the various problems were met and handled

C. J. DeMers

Secretary, Chamber of Commerce, Inc., Huntsville, Ala.

EVERY gas man who reads his technical journal has come across the "job wanted" ads, which, with variations in the number of years mentioned will read "years of experience," mostly the number of years are from 15 to 20.

I have often wondered with my own experience in mind what wonderful stories could be gleaned for the edification of the present and coming gas men could they but be correlated. I trust that I will not be considered guilty of egotism if references to myself seem too broad in some of these paragraphs for I am seeing and writing of my past service in the gas industry as though I were another personality and all of the events and incidents actually happened.

Back yonder in 1906 I started in and during those days, as at present, the fraternity as a whole spoke of the new business departments as something recently formed although I have since come to learn that many concerns had sold appliances sponsoring a department for the purpose as early as 1885 and although they had very little to offer they, in comparison, probably worked just as hard to increase the output as we do today. Time changes conditions rapidly and we are all prone to see only the things that are happening at our own door.

First Company Competitive

My first company was a competitive one; that is, there were two gas companies in the city of a hundred thousand and every employee of each was continually on his toes to keep our own customers satisfied and get the other fellow's at whatever cost.

Both organizations strove always to secure the largest number of customers. It was nothing unusual to the meter reader to find that the meter he had been reading for months was now disengaged and lying useless on the floor of the cellar, disconnected by the other company, but next month when he returned it might again be in use, the solicitor for his company having in the meantime convinced the customer of the superiority of his service. Many times wordy battles ensued between the solicitors and once I remember a fistic encounter in which one solicitor received a decorated eye.

At that time the automatic water heater was little known, and one day an excitable little Italian came in and, seeing one on the sales floor, became very much interested in it and when told that it was a water heater and its price immediately ordered it installed in his home. He paid half of the price down and next day our men hooked it up and instructed him that to get hot water he must turn on the faucet. The second day after its installation Tony rushed into the office and cried "Water heater no heata my house. I letta da water run ever since and house no heata up."

The Affair With the Chinaman

After a long conversation we found that he thought the heater would heat the house and in some manner this result would be secured by turning on the water at the faucet. When he learned the truth he kept the heater but always thought we had cheated him. On the same order was the Chinaman who insisted that we change his 20-light meter for a 3-light "like the one his friend was using," claiming his friend's bills were very much smaller than his, and a full explanation that a twenty-light was required for his appliances did no good. Accordingly he changed to the other company, who gave him a five-light, and he was forever satisfied because they also disconnected some of his appliances at his request, and he, of course, received smaller bills thereafter.

Politics and Baby Buggies

Ours being a political concern we had men that were hired more on account of their allegiance to the party than for their ability. One Saturday afternoon a lady called up and asked very politely if we wouldn't kindly send down and disconnect her baby buggy as she wanted to take baby out for an airing. Upon investigating we found that our fitter had that

morning piped three outlets at her home and had run the riser through the handles of the buggy. It was necessary to send an emergency man down to cut the pipe loose and then reconnect the lines.

In one of the small towns of which I had charge the street foreman one day told me the following story: He had just employed a new laborer to dig a service trench and had started him in just over the main. Returning several hours later when he thought the main should be bared and ready for tapping he was very much surprised to find his new man twenty feet from the spot he had indicated. When asked why he had dug the hole there instead of where he had been instructed to dig he said, "Oh the ground is much softer here."

Making Up the Payroll

There is something in public service that compels allegiance to the business and the customers, rather than to outside influence. There was the meter reader I once knew who, being told, one biting cold morning, that unless we received the money from the pre-pay meters that day none of the boys would be paid, went out in a blizzard and, fighting the snow, wind and cold, returned at nightfall with practically all of his allotment of meters read and the quarters ready to turn in, enough to make up the payroll for that month. With his company the going was somewhat rough, bills were hard to meet and pay-days were monthly. He chose to buck the blizzard so that his meters would be read on time and his coworkers receive their pay.

The Frozen Main

I was district superintendent of a plant that fed some twenty-six small towns some years after leaving my first job, the town in which I lived being next to last on the line. This town and the last one were fed by a district holder and one governor from the high pressure line, the gas being made twenty-eight miles away.

Gas for lighting was mostly in vogue then and it was my job to see that gas and merchandise sales were always on the increase. December of 1917 saw some of the coldest weather ever known at the place and just after Christmas we received several complaints about the pressure and about 5 o'clock one night found that the whole town would be off unless something was done quick. We placed pressure gauges all up and down the main street and finally located the trouble where a six-inch main was exposed and hung alongside of a small bridge. The water had condensed and frozen, the ice completely filling the inside of the pipe, and a syphon drip was located close by but buried under ten feet of rock-hard frozen earth. Where the pipe was exposed a two-inch tap had previously been made so we heated the main with welding torches, then placed gas tubing in the hole and syphoned the water off in that manner. Four hours were required before the last was drawn off, but full service had been restored within an hour. We located the source of the water a few days later. There was a leak in the pipe a hundred yards above the bridge. In order to get to the pipe it was necessary to keep a fire going for twenty-four hours to thaw out the ground.

Unaccounted for Gas At the Hotel

It was in this same town that one of the best paying hotels in that section was located. It was also a good customer of the gas company, for we had eighteen three and five-mantle arcs in use every night until 12 and 1 o'clock, and each room was fitted with gas, while in the kitchen the fuel was all gas. The proprietor told us one day that he would not use our gas any longer and, as the meter had not registered, we concluded that he had gone over to the other company. However, our meter reader happened one day to speak of it to their reader, deploring the fact that he had lost so good a customer. To his great surprise the other man said that if that hotel was a good customer he didn't know it, for they never used any gas.

After discussing the matter thoroughly the pair decided to go together and read their meters. This they did and neither meter showed consumption, yet gas was certainly being used.

It so happened that upon the day that these men made their investigation the hotel man was absent, so both sent word to their respective bosses who in turn sent for the fitters to help solve the problem, and then it was found that a service installed before the hotel was built and used to feed a factory next door had run right through the cellar and had been tapped for use by the hotel without the formality of using a meter. My company gained here, for their service had been used, and the hotel settled for hundreds of dollars.

Resourcefulness

A paint factory owner sent for me and said he would use a large quantity of gas in boiling and steaming if we'd only give him service. The factory was a mile from our high pressure main and finances would not allow the expense of running so much pipe on a proposition of which we were not certain, since the paint man wanted to use the appliances he then had in use, buying only a few gas burners to place under them. It was a good gambling chance to secure a new account but our manager wouldn't take the chance on account of the outlay. While walking over to the factory one day, with the boss, I stumbled over a pipe that protruded from the ground which turned out to be a water pipe installed two years before but now found inadequate. A suggestion that this pipe be used for the gas service met with approval and, upon being connected and cleaned out, proved as useful as though new. The customer later purchased a thousand dollars' worth of gas appliances and his monthly account, amounting to around eighty dollars, was indeed welcome.

Episode of the Lighting Fixtures

Just before the Fall of 1915 a new type of gas lighting fixture was placed on the market. I remember them well, for we selected and purchased fifty of them.

During September of that year we placed six of them on a small auto truck and canvassed each home. We would ask permission to install the new fixture for a few days and it always stayed. Once in a while we had to make a sales talk a few days later and twice we had to remove the new fixture and replace the old one but within ninety days we had sold over one hundred new fixtures by this method and where such a market had never been touched before. An advantage in these sales to my company lay in the fact that a customer making a cash outlay amounting to from fifteen to fifty dollars for one of these new fixtures was less liable to respond to the sales talks of the electric company, whose men were always ready to take our lighting consumers. A similar proposition to the above happened in a small town in which I had offered my services as local manager. I arrived in mid-summer and within two weeks had ordered two hundred reflex lamps for the Fall trade. Our meter reader and collector who had held the position for the two years previous was considerably agitated at this action. He called me to the stock room and solemnly showed me a shipment of lamps received the year before. He said, "Man, alive, we bought 72 of these and offered them for $1.75 and there are still 65 of them; how do you expect to sell 200 at a higher price? Why, those lamps will be around here for the next ten years." However, we sold that year an extra order of 200 at $2.25 each at a sales cost of 26 cents each.

Three years later in another small town my company had purchased I was sent to establish a sales department. The former superintendent here had had charge for over forty years and was placed in charge of the new stock room.

When our first order of gas ranges arrived, which totalled a car of one hundred and twelve, he told me that we then had plenty for the next ten years but thought we were making a mistake in ordering so far ahead. That summer we sold that car and two more, but the old gentleman never was convinced that we fully expected to sell more than one hundred ranges in one year.

Gas appliance sales must be stimulated by intensive campaigns, newspaper and circular letter publicity and by public demonstrations. Increased efficiency of the electric lamp has pushed gas lighting to the background but there is far more business for gas companies today than there ever was. Gas for cooking, and water, and space heating and for industrial uses have far exceeded former demands so the industry today faces a much brighter outlook than ever.

BURNING GAS SEEN AS AID TO FARMERS

Farmers will add their protests to those of public health workers, industrialists, and lovers of civic beauty when they realize that burning coal in its "raw" state is robbing the land of valuable fertilizers, chemists attending the recent International Coal Conference in Pittsburgh said.

Importation of nitrates from Chili, and fixation of nitrogen from the air are unnecessarily expensive, the scientists claimed. They pointed out that a ton of coal contains 145 pounds of ammonium sulphate —a valuable fertilizer—and that when the coal is used for the manufacture of gas, a large portion of the fertilizer is recovered. When burned "raw" these valuable by-products are not only wasted, but the air is polluted with smoke and soot.

Although the chemists state that at the present time the problem is not producing more food, but instead enabling the farmer to produce the same quantity with less labor and expense, they show that fertilizers will make it possible for the world to support a quadrupled population.

"The average man is not going to starve," said Louis C. Jones, a New York chemist, for "when we want, we shall make food from coal or wood."

¤ ¤ ¤ ¤

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The State of Existing Data on Heat Transfer Through Insulation in the Moderate and High Temperature Fields *

L. B. McMillan

Chief Engineer, Johns Manville, Inc., New York

(Continued from Feb. 5th)

Effect of Air Velocity on Heat Transfer from Surface to Air. The principal need for more complete data on surface losses is that, until these are accurately expressed in terms of their component parts, *radiation* and *convection,* and until the effect of air velocity on the latter has been accurately determined, no satisfactory statement of the effect of air velocity on heat losses from surfaces may be obtained. The work of Langmuir's[1] is outstanding in this connection.

For radiation he uses the Stefan-Boltzmann equation, which, in engineering units may be expressed as

$$W_R = 0.178\,E\left[\left(\frac{T_1}{100}\right)^4 - \left(\frac{T_2}{100}\right)^4\right] \quad (13)$$

and for convection he has developed the equation, which for still air under average conditions may be expressed as

$$W_C = 0.296\,(T_1 - T_2)^{\frac{5}{4}} \quad (14)$$

The total rate of heat transfer is represented by the sum of these. He shows that convection is increased by air circulation, according to the equation

$$W_{CV} = W_C\sqrt{\frac{V + 68.9}{68.9}} \quad (15)$$

The increases in heat transfer due to air velocity calculated from these equations, at various surface temperatures and with an air temperature of 80 degrees Fahrenheit are shown in Fig. 14. The actual rates of heat transfer, under the same conditions, are shown in Fig. 15.

In the above equations, W_R and W_C represent respectively the rates of heat transfer by radiation and by convection under still air conditions. W_{CV} represents rate of heat transfer by convection at any air velocity. All are expressed in B.t.u. per square foot per hour. E is the emissivity coefficient which for black body conditions is unity. T_1 and T_a represent the absolute temperatures of hot surface and of air, respectively, and T_2 represents the absolute temperature of surrounding objects to which heat is radiating. V represents the velocity of air flowing over the surface, expressed in feet per minute.

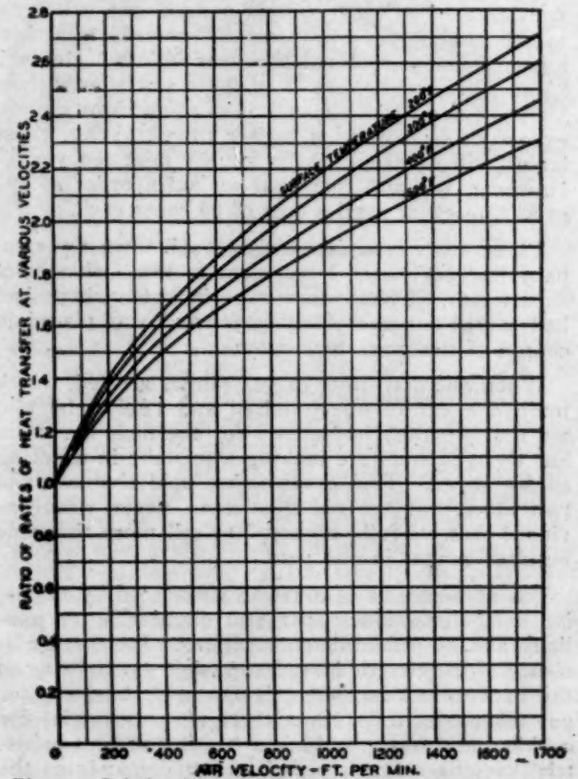

Fig. 14. Relative Rates of Heat Transfer at Various Air Velocities, Based on Langmuir's Equations. (Rate of Heat Transfer Under Still Air Conditions Considered as Unity.)

[1] Trans. American Electrochemical Society, Vol. 23.

* Presented at the Heat Transfer Session arranged by the National Research Council Committee on Heat Transmission at the Annual Meeting of the American Society of Mechanical Engineers, in joint session with the American Society of Refrigerating Engineers, 29 West 39th Street, New York City, December 7, 1926.

While Langmuir's analysis of the problem is very convincing it is probable that the effect of air velocity is greater than he has shown. In Fig. 16 are shown results of tests by other investigators, many of whom show increases more than double those given by Langmuir's equations. The results given by T. S. Taylor are of particular interest since he shows that the angle of incidence of the air stream on the surface has a marked effect on the rate of heat transfer. It is not difficult to ascribe highly probable reasons for many of the most glaring disagreements in the various results shown in this chart. The differences between effects of stream line and turbulent flow and the failure to define, with reference to the surface, the point at which velocity was measured are outstanding possibilities in this connection.

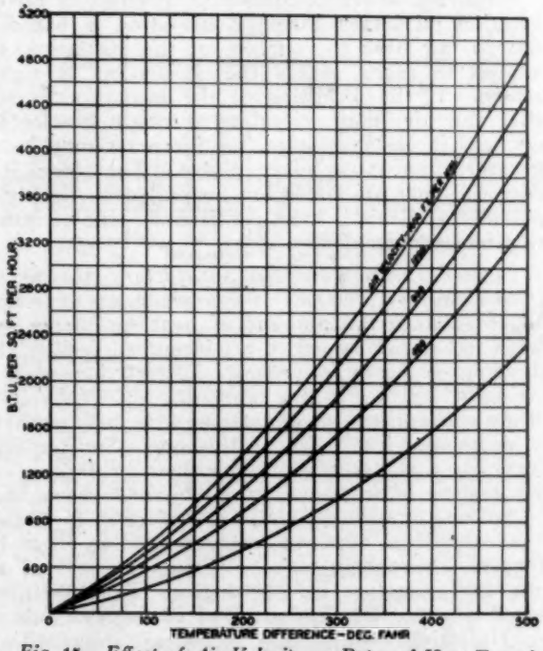

Fig. 15. Effect of Air Velocity on Rates of Heat Transfer from Surfaces of Various Temperatures. (Air Temperatures 80 degrees Fahrenheit.)

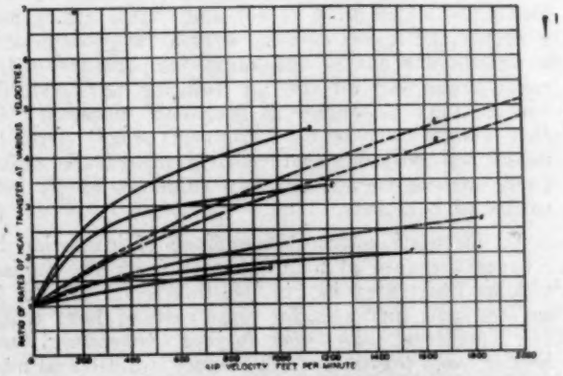

Fig. 16. Relative Ratio of Heat Transfer at Various Air Velocities as Shown by Different Investigators. (Rate of Heat Transfer Under Still Air Conditions Considered as Unity)[1]

Effect of Air Velocity on Heat Transfer Through Insulation. In the case of well insulated surfaces the increases in heat losses due to air velocity are very small as compared to the increases just shown for bare surfaces. This is due to the fact that air flowing over the surface of the insulation can increase only the rate of heat transfer from surface to air and cannot change the internal resistance to heat flow inherent in the insulation itself.

The effect of the air circulation, therefore, is to cool the surface of the insulation to a temperature lower than it would have under still air conditions, thereby increasing the temperature drop through the insulation. This is illustrated in Fig. 17 by the decrease in temperature from t_2 to t'_2. Since the heat transfer in a given case is proportional to the temperature gradient, it is obvious that the heat bow will be greater when the temperature difference is $t_1—t'_2$ than when it is $t_1—t_2$.

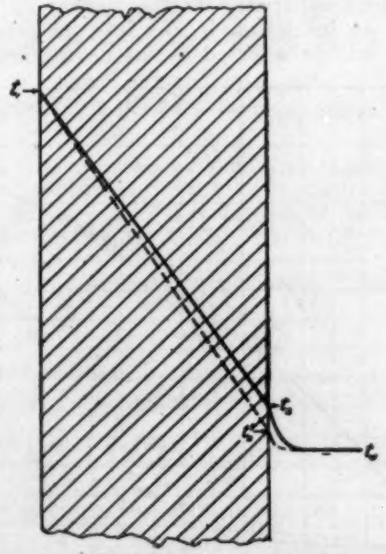

Fig. 17. Temperature Gradients through Insulation. (The Dotted Curve Represents Temperature Gradient when Surface of Insulation is Subjected to Air Circulation.)

In the case of surfaces located out of doors, the combined effect of wind and rain may bring the surface temperature of the insulation practically down to the air temperature, yet even in this extreme case the increase in heat loss through the insulation is not as great as might be expected. This is illustrated by the following example, based on a flat surface insulated with 2-inch thick material, having

[1] A—T. S. Taylor, Trans. A. S. M. E., Vol. 42, page 243 (Surface Temperature 113 deg. Fahr.); B—T. S. Taylor, Trans. A. S. M. E., page 243 (Surface Temperature 131 deg. Fahr.); C—J. A. Moyer, Journal A. S. R. E., Nov., 1915, pages 26-36 (Glass Cube with Air Spouts); D—J. A. Moyer, Journal A. S. R. E., Nov., 1915, pages 26-36 (Glass Cube with Cone); E—J. A. Moyer, Journal A. S. R. E., Nov., 1915, pages 26-36 (Glass Cube with Shield); F—J. A. Moyer, Journal A. S. R. E., Nov., 1915, pages 26-36 (Red Brick no Shield); G—Langmuir (Equations 13, 14 and 15). (Surface Temperature 200 deg. Fahr.). (Air Temperature 80 deg. Fahr.).

a conductivity of 0.5 B.t.u. per square foot, per degree temperature difference per 1-inch thick, per hour, and a rate of heat transfer from its surface to air under still air conditions of 1.8 B.t.u. per square foot per degree temperature difference per hour.

$$\text{Internal resistance of insulation} = \frac{2}{0.5} = 4.0$$

$$\text{Surface resistance} = \frac{1}{1.8} = 0.556$$

$$\text{Total Resistance} = 4.556$$

$$\text{Rate of heat transfer} = \frac{1}{4.556} = 0.22$$

B.t.u. per square foot per degree temperature difference per hour.

If the surface resistance were completely eliminated, due to the cooling action of wind and rain, the internal resistance of 4.0 would still remain, and the rate of heat transfer would be $1/4.0 = 0.25$ B.t.u. per square foot per degree temperature difference per hour. Therefore, the maximum increase in loss due to wind and rain would be

$$\frac{0.25 - 0.22}{0.22} = 13.6\%$$

In like manner, it may be shown that the maximum increase for 1 inch thickness of the same material under the same conditions is 27.9 per cent, and in the case of 3-inch thickness, 9.2 per cent. It is therefore apparent that the thicker or the more efficient an insulation is, the less its rate of heat transfer will be affected by air circulation.

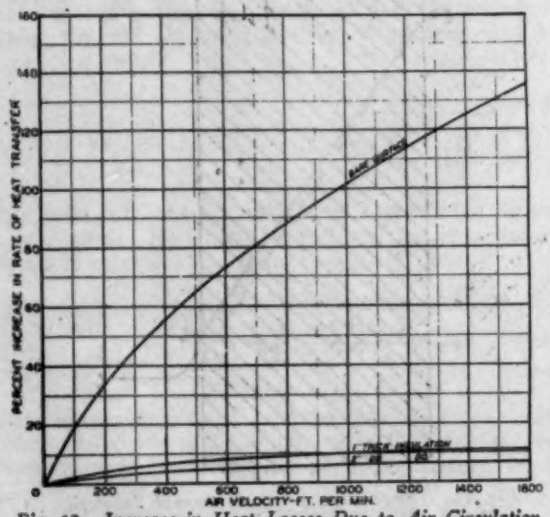

Fig. 18. Increase in Heat Losses Due to Air Circulation.

Figure 18 shows graphically the relative increases in rates of heat transfer, due to air circulation, in the case of a bare surface maintained at 400 degrees Fahrenheit, and the same surface insulated with 1 inch and 2-inch thicknesses of an insulation with a conductivity of .48 B.t.u. per square foot, per degree temperature difference per 1 inch thick, per hour. In these curves the effect of air velocity on rate of heat transfer from surface to air is based on Langmuir's equations.

All of the above discussion as to effect of air circulation on losses through insulation is based on flow of air over the surface of the insulation, and applies to cases where the insulation is tightly sealed. If the condition of the insulation is such that the air may circulate through cracks and crevices in the insulation, the increases may be far greater than those given above. Therefore, it is essential that all insulation be sealed as tightly as possible, and this is most particularly true of insulation located out of doors.

Surface Temperature No Satisfactory Measure of Heat Transfer. The lack of a simple means to measure approximately the amount of heat loss from surfaces has naturally led to a widespread feeling that the degree of effectiveness of insulation may be estimated by the surface temperature. Probably no other conception in connection with heat transfer is so generally misused as this one. Surface temperature considered alone, without reference to temperature of surroundings, is *absolutely no measure of the rate of heat transfer.* A surface at 150 degree Fahrenheit in a confined space exposed to air at 150 degrees Fahrenheit may be losing no heat at all, whereas a surface at 100 degrees Fahrenheit exposed to air at a temperature of 50 degrees Fahrenheit is losing heat in very considerable quantities.

Measuring the difference between the surface temperature and the air temperature is a little better, but not much, unless all other conditions are identical—which they rarely are. It is easily possible for the losses to vary over a range of several hundred per cent at the same temperature difference, depending on the air velocity to which the surface may be exposed. Nor is it necessary for that velocity to be very high in order to render either surface temperature or temperature difference, surface to air, entirely valueless as an indication of heat loss.

Air circulation over the surface of insulation increases the rate of heat transfer from the surface and, as illustrated in Fig. 17, this tends to cool its surface and increase the total rate of heat transfer. Therefore, *with lower surface temperature, more heat is being transmitted.* This fact is illustrated more forcibly in Fig. 14 where it may be seen that the rate of heat transfer from a surface of 100 degrees Fahrenheit above air temperature and exposed to air circulating at a velocity of 400 feet per minute (approximately 4.5 miles per hour) is greater than for a surface of 150 degrees Fahrenheit above air temperature but exposed only to still air.

Reference to Fig. 19 illustrates still more clearly why surface temperatures do not give a reliable measure of heat transfer through insulation. The solid line curves are based on the factors given in Fig. 14, while the dotted line curves illustrate conditions which would exist if the increases in surface transmission rate due to air circulation were of the order of the higher values shown in Fig. 16.

It is apparent that the higher rates of increase of surface losses would have little effect on the total rate of heat transfer while surface temperatures would be still further reduced.

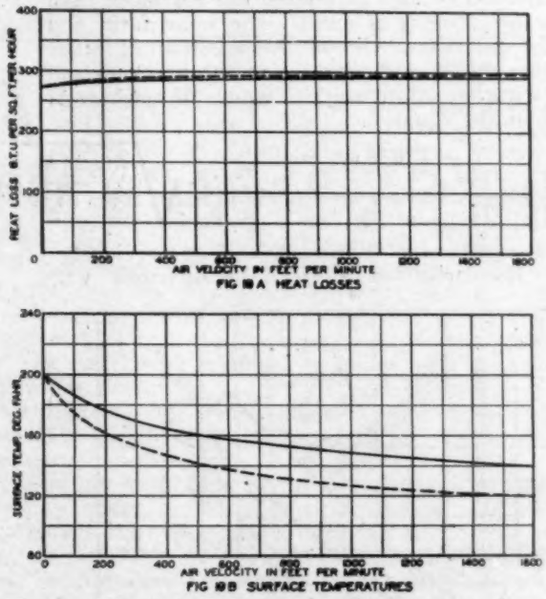
HEAT LOSS B.T.U. PER SQ. FT. PER HOUR
AIR VELOCITY IN FEET PER MINUTE
FIG 19 A HEAT LOSSES
SURFACE TEMP. DEG. FAHR.
AIR VELOCITY IN FEET PER MINUTE
FIG 19 B SURFACE TEMPERATURES

Fig. 19. Effect of Air Velocity on Heat Losses and on Surface Temperatures of Insulation.

Air circulation is not the only cause of unreliability of surface temperature as a measure of heat loss. Exposure of the surface to other nearby hot or cold surfaces, and the nature of the surface itself, may have almost if not quite as noticeable effects on surface temperatures. A bright, polished surface may be losing heat at a rate not much over half as great as that from a dull surface and yet have a higher surface temperature.

While these variables will have relatively little effect on the total heat transmitted by the insulation, they may have entirely disproportionate effects on surface temperatures.

5. Economic Data

Perhaps the most valuable use for accurate data on heat transfer in connection with insulation is in the calculation of the thickness of insulation required under various conditions for most economical results. There have been many contributions to the literature on this subject, but most of the methods presented have been graphical. A notable exception is P. Nicholls' contribution[1] on the Economic Thickness of Insulation in the Refrigerating Field. However, long before that paper was presented the author had been using in his own work a rational analytical method for insulation on flat surfaces and has just recently extended this to apply to pipe surfaces.

Referring to Fig. 20, as the thickness of insulation is increased the cost of heat lost per year (m) is decreased, but the cost per year of insulation (n first cost multiplied by per cent fixed charges) is increased. Therefore, the thickness at which the sum of these two costs is a minimum is obviously the most economical.

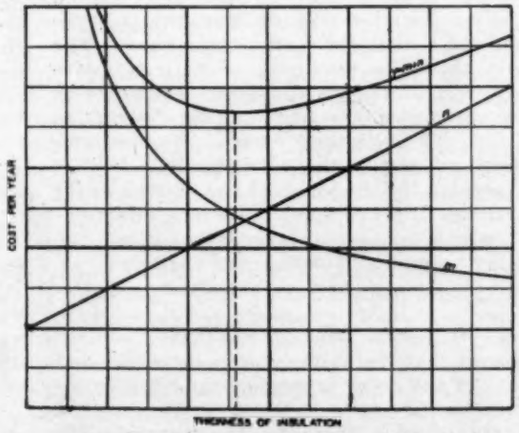

Fig. 20. Economical Thickness of Insulation.

For flat surfaces this may be determined from the equation

$$X = \sqrt{\frac{ak}{b}} - Rk \quad (16)$$

in which x is the most economical thickness, k is the conductivity, b is the cost of insulation in dollars *per inch thick per year,* R is the sum of the resistances of all other elements in the construction, including surface resistance, and

$$a = \frac{Y(t_o - t_a)M}{1{,}000{,}000} \quad (17)$$

in which Y is hours operation per year, t_o is inside temperature, t_a is temperature of surrounding air,

[1] Refrigeration Engineering, Nov., 1922, page 152.

TABLE I—Values of "a"

Temp. Diff. Deg Fahr.	Value of Heat in Dollars Per Million Available B.T.U. .10	.20	.30	.40	.50	.60	.70	.80	.90	1.00
100	.088	.175	.263	.350	.438	.526	.613	.701	.788	.876
200	.175	.350	.526	.701	.876	1.051	1.226	1.402	1.577	1.752
300	.263	.526	.788	1.051	1.314	1.577	1.840	2.102	2.365	2.628
400	.350	.701	1.051	1.402	1.752	2.102	2.453	2.803	3.154	3.504
500	.438	.876	1.314	1.752	2.190	2.628	3.066	3.504	3.942	4.380
600	.526	1.051	1.577	2.102	2.628	3.154	3.679	4.205	4.730	5.256
700	.613	1.226	1.840	2.453	3.066	3.679	4.292	4.906	5.519	6.132
800	.701	1.402	2.102	2.803	3.504	4.205	4.906	5.606	6.307	7.008
900	.788	1.577	2.365	3.154	3.942	4.730	5.519	6.307	7.096	7.884
1000	.876	1.752	2.628	3.504	4.380	5.256	6.132	7.008	7.884	8.760

and M is the value of heat in dollars per 1,000,000 B.t.u. In Table I are given values of "a" for various temperature differences, various values of heat and 8,760 hours per year.

Equation (16) applies to combinations of any number of materials, the resistance of all but one being provided for in the term (R). The physical explanation of the situation is that the value of the term

$$\sqrt{\frac{ak}{b}}$$

gives the thickness of the one material which would be required if there were no other insulating value in the construction than that offered by the material itself. If only one material is involved, the only deduction required is that for surface resistance. The term $R_s k$ is then the thickness of material with conductivity (k), which has the same resistance as the surface resistance. In like manner deductions are made for the insulating values of other elements already present in the construction. If it is desired to increase the thickness of the first layer for some reason, as, for example, to reduce the temperature to which the second layer is subjected, the solution is very simple. The value of the term

$$\sqrt{\frac{ak}{b}}$$

does not change, but the value of R is increased and the thickness of the outer layer correspondingly decreased.

In the case of pipe surfaces, the equation for economical thickness is not quite so simple, yet it is by no means as formidable as it appears at first sight. For one material the cost of which may be expressed by the equation

$$\text{Cost per linear foot} = \frac{2\pi r_2 b}{12}(r_2 - r_1) + C \quad (18)[1]$$

$$(r_2 \log_e \frac{r_2}{r_1} + R_s k)\sqrt{\frac{2r_2 - r_1}{r_2 - R_s k}} = \sqrt{\frac{ak}{b}} \quad (19)$$

All terms in these equations have previously been defined.

Recognizing that the first term within the parentheses is equivalent thickness, the close similarity to Equation (16) is at once apparent, since Equation (16) may be written for one material

$$X + R_s k = \sqrt{\frac{ak}{b}}$$

Before proceeding with the solution of Equation (19), the equation for economical thickness of the outer layer of insulation over one or more layers of materials having different conductivities will be written, since the same charts may be used for the solution of equations involving all such combinations. This equation, given below, is written for a combination of two materials, but for more than two the equation is of exactly the same form and the only difference will be the addition of other terms like the second term inside the brackets and the substitution of appropriate values of r where r_s appears in the equation

$$[r_s \log_e \frac{r_s}{r_2} + \frac{r_s}{r_1}(\frac{r_1 \log_e \frac{r_2}{r_1}}{k_1})k + R_s k]\sqrt{\frac{2r_s - r_2}{r_s - R_s k}} = \sqrt{\frac{ak}{b}} \quad (20)$$

In this equation all terms have been previously defined. Its derivation is given in Appendix VI.

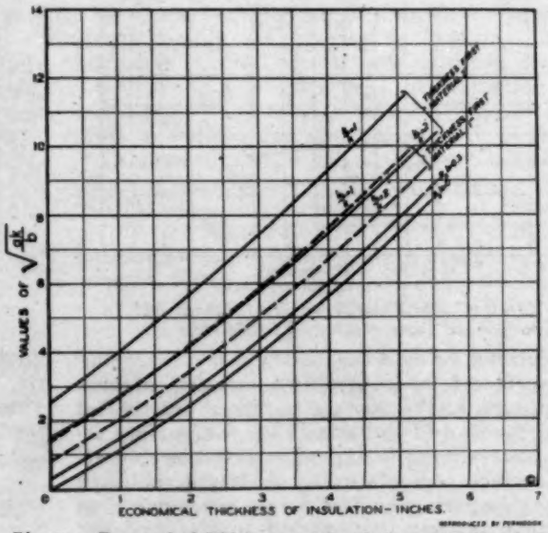

Fig. 21. Economical Thickness of Insulation on Cylindrical Surface 16 inches Diameter

The solution of this equation for 16-inch pipe is illustrated in Fig. 21. (a), (k) and (b) are established by the conditions of the problem. Knowing the value of

$$\sqrt{\frac{ak}{b}}$$

the economical thickness may be read directly from the chart. For example, if

$$\sqrt{\frac{ak}{b}} = 4.0$$

and if no surface resistance is to be considered, the economical thickness is 3.03 inches. If $R_s k = .3$ inch the economical thickness is 2.80 inches. If there is a first layer of material 1 inch thick and if the conductivity of that layer is 2.0 times that of the second layer (and $R_s k = 0.3$), the economical thickness of the second layer is 2.38 inches. For intermediate values interpolations may be made. Naturally the thickness chosen would be the commercially available thickness nearest the thickness found on the chart.

(Continued on page 165)

[1] The so-called "Standard List Prices" of sectional pipe insulation are in reasonably close agreement with this equation for thicknesses greater than 1". Prices of cork pipe covering follow no regular law. Therefore these Equations (18), (19) and (20), do not apply to cork.

The Public's Measure of an Industry*

David Lawrence

Publisher, United States Daily, Washington, D. C.

AT the risk of making a very poor pun, I could not help but wonder why you had a newspaper man address a meeting of the gas industry. But I think I can guess. Most of us are accused of producing the same fuel that you do. I hope, however, that the few things I will say to you will not escape but remain as fuel for thought.

I can imagine nothing more important to an industry than to get a perspective of that industry from the outside. Being in industry myself, I know how often I seek the impressions of people outside of my own business. I like to know what the other fellow is thinking about. So I have thought that I might give you some fundamentals which occur to me as being characteristic nowadays of the public's measure of an industry.

It is not so long ago—to be accurate it is about twenty years ago—that the attitude of industry, corporations to be exact, toward the public was one which we might describe in a slang phrase as that of "the high hat." Slowly there has come an evolution and industry has recognized that public interest cannot be treated with indifference.

This has come about gradually. We probably have not noticed it because it has been gradual, but all you need to do is to contrast the attitude of the public today towards public utilities, for instance, with the public's attitude twenty years ago and you will realize that there is an intimate association.

New Industries Should Profit By Mistakes in the Past

Naturally, some industries have failed to see the light. Some of the newer industries are making today the mistakes that have been made in the past by other industries. I need mention no names, but I think you can recall offhand some of the industries that are conducting their experimentations at the cost of the consumers—at the expense of the consumers.

Perhaps that is the first characteristic of the public's measure of an industry: Is the industry making the consumers pay the cost of its experiments or is it guaranteeing the cost of those experiments?

If an industry has become interested in the public from the point of view of selling to the consumer, it is also true that in recent years the public has become interested in industry from the point of view of ownership in that industry. Both things rest on the same foundation—confidence. You cannot sell extensively to the consumer without winning his confidence; and the consumer will not invest in the securities of an industry unless he too has confidence in the management by that industry of its physical affairs.

Customer Ownership Cannot Solve Ills

Without going into the merits of customer ownership; without discussing that very helpful phase of modern industrial development, let me say at this point that customer ownership cannot solve the ills of an industry which is basically unaware of the demands of the consumers. You might have in some cities a large number of owners but they will be a mere handful if the utility in question has thwarted public good-will.

The American gas industry appeals to me as one which has a future ahead of it rather than a past behind it. The gas industry has not offended the public in a broad sense; the gas industry has performed a useful service. Here and there throughout the country utilities have been in conflict with local authorities, political difficulties have arisen. But basically, gas has been an important part of the home development of our country.

As I learned of the many things that are planned, of the many extensions of your industry that are still possible, it seemed that the most important task which is ahead of you, at least from a layman's point of view, is that which will make the public have confidence in your industry.

Confidence is a peculiar attribute. It does not come suddenly. It comes gradually. You are almost unaware of the progress of the germ. But it sinks in and takes hold and at the end of a period of time you have built up a wall over which a competing industry cannot climb.

How to Get Confidence of Public

How is confidence obtained? You will say offhand: "In the every-day relations between seller and consumer." Yes, that is true, but if you have new products, if you have new things to tell about, you cannot get them across through the contacts of salesmen alone.

I believe that statistics show that at no time in recent years has it been as difficult for merchandise to be distributed by salesmen, to be sold by salesmen, as it is today. Whether it is due to the prosperity of the country; whether it is due to the remarkable expansion we have encountered since the war, is a question. But it is a fact that selling by salesmen alone is not the effective instrument that it used to be.

To go direct to the point I have in mind, you must present your story; you must present your

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* Paper presented at the General Session, 8th Annual Convention, American Gas Association, October 13, 1926, Atlantic City, N. J.

activities to the public in some way. We use the term "publicity" to express that. In the newspaper business we have a horror of the word "publicity" because for many years it has been associated with what we call illegitimate attempts to get space that should be paid for. And yet it is a good English word and the dictionary says it is "the expression of your thoughts."

To get confidence, therefore, you must have the proper expression of the best that is in your industry. Advertising immediately suggests itself as the big instrument available today and yet without fear of antagonizing or being misunderstood by men in my own business, I will say frankly to you that there are skeptics outside of the advertising field and that those skeptics have a great deal more merit to their cause than at first seems plausible.

The skepticism about advertising is this: The big question mark is: "Is it effective?" Unfortunately judgments are rendered not on any particular piece of advertising but upon the sum total of advertising which affects the individual. There is good advertising and there is bad advertising.

Poor Advertising Engenders Prejudice

If you will seek in your own mind, you will find that a great deal of the prejudice against advertising is due to the fact that you have read poor advertising, or that a great many advertisements have not interested you personally. And yet as we study the effect of impressions—because after all that is what advertising is—we find that the merchandise of the country is being moved by advertising.

But apart from what I may call direct selling by advertising, there is a greater and more important thing to an industry—good-will. That is a more subtle approach to the public mind and that requires greater skill. Advertising is worth while if you do it right and it is all wrong if you do it wrong.

The importance of presenting steadily to the public mind the merits of your industry through advertising cannot be over-estimated. You need turn only to some of the largest industries which are doing advertising to see the results.

$900,000 Spent for Advertising

I know of one concern—an oil burning concern in the west that spent $900,000 for advertising recently. I can point to a number of such instances. One company is spending $5,000,000 this year. I hesitate to give you the name. You can probably guess it. It is in the oil business.

Large sums are being spent not with the idea of today and tomorrow and this year but the future. Advertising is like building a house or a structure of any kind. You lay your foundation at one time. You build and super-impose as you go along and the sum total effect at the end of three or four or five years is what determines whether you have been successful. And almost never has a campaign of that kind for good-will been abandoned.

I have no selfish interest in whether such a campaign is undertaken or not. Please do not misconstrue my suggestions in that respect. But I have observed a great many industries in operation; I have seen a good deal in the way of advertising and I am particularly interested in what I call the good-will relationships between an industry and the public. I think that is very vital.

Of course, advertising alone will not do the trick. There must be relationship between the customer and the company which makes for permanent good-will.

Monopoly Alone Will Not Draw Customer

There are some industries which will expect the customer to come to them simply because they have the monopoly. Time will prove that that is a wrong theory; that the man who buys anything is entitled to courteous consideration from the man who sells to him.

And so we take up what seems to me to be the next point in the public's measure of an industry. That is the behavior, so to speak, of the industry within itself.

Development of Trade Associations

The development in the last ten years of trade associations has been remarkable. Almost every important line of business has seen the necessity for trade association work. In some instances they have gone to the point of combinations and have run counter to the courts. In other instances they have remained loose organizations without much effect from within. But the movement to combine men who are in the same line of business is proceeding and almost every year sees an increase in the number of trade associations.

For my part, I think they are the most important of our industrial development. Whethery they do so designedly or not, they tend to remove ultimately the waste in industry. They tend also to move upward the level of the industry in its relations with the public.

After all, a trade association is a conglomeration of competing elements. My observation of some of the more successful associations is that they make most progress when they push heartily on those things upon which there is universal and unanimous agreement and when they sidetrack those things upon which there is dissension or friction.

Many trade associations are being halted every day by their inner competitive currents. From what little I know of your industry, I find that you have been pressing forward with a solid front. It is most essential, it seems to me, that the trade association of the future shall move always forward, shall move always toward that point which protects the public against abuse by the minority elements within an industry.

Such work as you are doing—the stamping with your own seal of certain models—is an excellent step in the direction of protecting the public. But when you do something as important as that, you should tell somebody about it. I am a layman. I never heard about it until I came to this meeting. It struck me as one of the most effective things that have been done.

Do Not "Run Down" Competitors

There is one word more about relationships with the public. Wise counsellors will no doubt prevent you from making the mistake, but where one industry is competing with another industry, it seems to me that there is more success obtainable in winning that confidence when the emphasis is placed on the merits of your industry, rather than on the disadvantages of the competing industry.

These fundamentals which I have outlined to you are what seem to me to represent the layman's interest in an industry such as yours.

One word in conclusion: I feel this is something that should always be said to business men. We are today in the midst of a rather remarkable era in the history of our country. We are moving so rapidly; we are thinking in terms of tomorrow, next week and the fiscal year so often that we forget we are in a ten-year epoch in a twenty-year era.

You are disturbed often, as are other business men, by rumblings and opinions on the outlook of business. It is unfortunate that business conditions can never be estimated in a single phrase or by a single map. To say that business is good, always seemed to me to be making a statement which is open to question, because business is never uniformly good and it is not always uniformly bad. But there are essentials in the present business outlook which strike me as significant.

The procession of prosperous elements in our economic situation is steadily onward. There will be dips; there will be fluctuations; there will be industries affected as cotton is today; there will be other disturbances such as we had in Florida affecting values there, but it is also significant that while these flourishes come, while these dips go on, the basic business situation of this country is not being changed materially.

In Washington, most of us feel that there is no danger ahead. We feel that in the next three to five to ten year this procession will be onward. We do not realize sometimes what the industrial expansion of the war did for us. We do not realize that we are more efficiently organized than ever before and that we are more alert than ever before, not only in the marketing of our products within our borders but abroad.

We have the machinery and we have the cooperation between the government and industry in a way that we never had before, so that we have become "big league" in our business operations throughout the world and in our industrial expansion within this country.

Business Outlook Encouraging

The business outlook, so far as I can see, from my talks with various men who have the facts, is one that is most encouraging; which does not in any way warrant the fear of a material change. Expansion programs, therefore, are possible for at least three to five years based upon the natural facts which are available to the economists that we have in Washington.

I find no one who is worrying about 1927 or 1928 except the politicians. The whole trend is toward expansion and efficient expansion. I thank you.

"The Utility and the Commission"

State Commissions active in promoting public good will

Frank Milhollan

President, Board of Railroad Commissioners of North Dakota

IT is gratifying to note that while volumes have been written upon the subject of public relations, and no doubt many of you have addressed yourselves to the subject, this great organization recognizes a need for further consideration thereof. Notwithstanding all that has been said and written regarding the relations between public utility companies and customers, and though there has been a marked improvement in such relations, there still is much to be accomplished. Someone has said that the tendency of fire is to go out; hence, if fires are to be kept burning we must constantly add fuel.

The amount of capital invested in public utilities, representing ofttimes the savings of thousands of small investors, and the life's work of others, and the service which is rendered by them, affecting the health and comfort of the people of the nation in all walks of life, make it incumbent upon us to inquire diligently as to the best methods of operation, management and regulation. We are endeavoring to see that adequate service is furnished to millions of consumers and at the same time to safeguard the interests of those who have invested capital, without which there can be no service. Obviously, in such an undertaking we have encountered many perplexing problems, some of which are even now only partly solved. Various theories of valuation, depreciation and related questions have had to be tested. Upon some questions no precedent could be found, and it has been necessary at times for the utilities and commissions to submit their differences to judicial

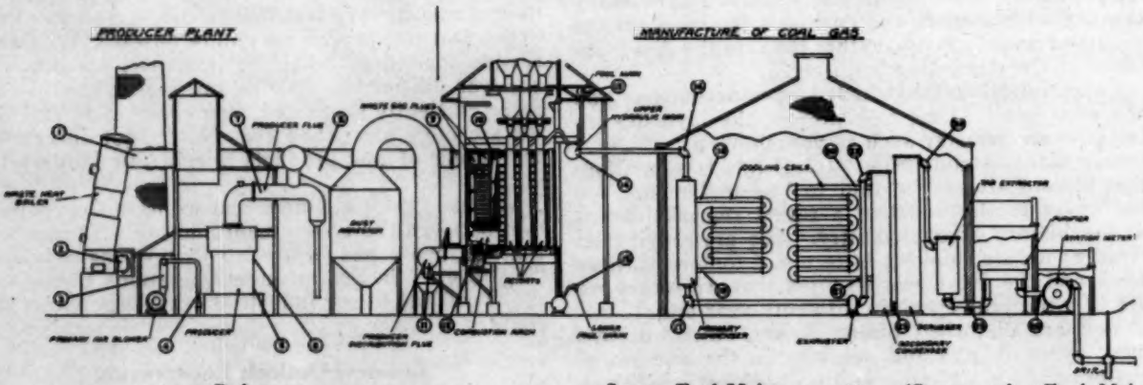
(Continued on page 168)

*Address delivered before the Public Relations Symposium at the American Gas Association Convention, Atlantic City, N. J., October 13, 1926.

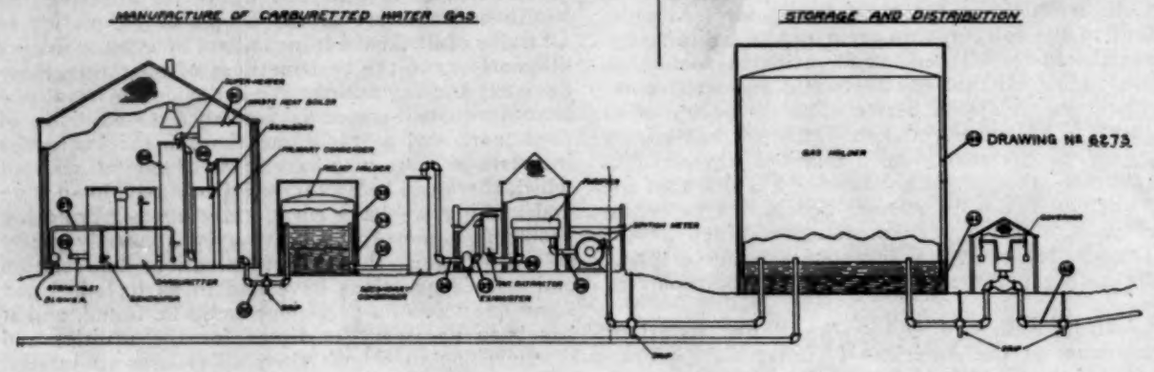
Layout of Gas Manufacturing Plants, Showing Points of Application of Tycos Instruments

The Taylor Instrument Companies of Rochester, N. Y., have embodied in their catalogue a folded section showing the layout of gas manufacturing plants and the locations of the various instruments in each case.

This matter is shown in the cuts given herewith and it would seem that it should be of interest to gas engineers as a whole, particularly the younger element.



Application	Reference Number	Instrument
Waste-Heat Boiler		
Flue Inlet	1	Indicating Pyrometer
Flue Outlet	2	(Same as for Inlet)
Primary Air Blower	3	Recording Pressure Gauge
Venturi	4	Recording Pressure Gauge
Gas Producer	5	Recording Thermometer
Water-Jacket Inlet		Indicating Thermometer
Water-Jacket Outlet	6	(Same as for Inlet)
Individual Producer Flue	7	Indicating Pyrometer Recording Pyrometer
Collecting Flue	8	(Same as for Individual Producer Flue)
Distributing Flue at Retort	11	(Same as for Individual Producer Flue)
Retort		
Waste-Gas Flue	9	Indicating Pyrometer Recording Pyrometer
Gas Inlet to Recuperator	10	(Same as for Waste-Gas Flue)
Combustion Arch	12	Féry Radiation Pyrometer
Foul Main	13	Recording Pressure Gauge Indicating Thermometer
Upper Hydraulic Main	14	Recording Pressure Gauge
Lower Foul Main	15	(Same as for Foul Main)
Primary Condenser	16	Recording Pressure Gauge
Inlet		Recording Thermometer
Outlet		Indicating Thermometer
	17	(Same as for Inlet)
Cooling Coils		
Inlet	18, 20	Indicating Thermometer
Outlet	19, 21	(Same as for Inlet)
Secondary Condenser		
Inlet	22	(Same as for Primary Condenser)
Outlet	23	
Secondary Scrubber	24	Recording Pressure Gauge
Outlet		Indicating Thermometer
Tar Extractor Outlet	25	(Same as for Secondary Scrubber Outlet)
Station Meter Inlet	26	Recording Pressure Gauge Recording Thermometer Indicating Thermometer
Generator		
Air Inlet	27	Recording Pressure Gauge
Steam Inlet	28	Recording Pressure Gauge
Superheater	29	Indicating Pyrometer Recording Pyrometer
	30	Recording Pressure Gauge
Scrubber Outlet		Recording Thermometer Indicating Thermometer



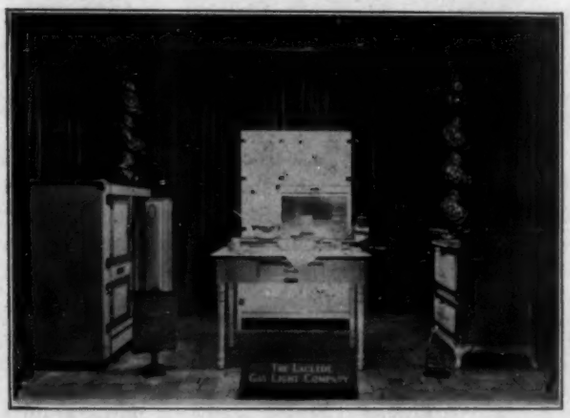
Application	Reference Number	Instrument
Waste-Heat Boiler.....	31	Recording Thermometer
Primary Condenser....	32	Recording Pressure Gauge Recording Thermometer Indicating Thermometer
Relief Holder		
Cups	33	Handled Thermometer
Tank Water.....	34	Maximum and Minimum Registering Thermometer
Secondary Condenser	35	Recording Pressure Gauge Recording Thermometer Indicating Thermometer
Inlet		
Outlet	36	(Same as for Inlet)
Exhauster Outlet.....	37	Recording Pressure Gauge Indicating Thermometer
Tar-Extractor Outlet...	38	Recording Pressure Gauge Indicating Thermometer
Station Meter.....	39	Recording Pressure Gauge Indicating Thermometer
Gas Holder	40	Handled Thermometer
Cups	41	Maximum and Minimum
Tank Water		Registering Thermometer
Distribution Lines	42	Recording Pressure Gauge
L. P. (to 1 lb.).....		Recording Pressure Gauge
H. P. (1 to 5 lbs.)...	Not shown	Pressure Regulator
Above 5 lbs.....	Not shown	Recording Pressure Gauge Pressure Regulator
Gas Mains.....	Not shown	Recording Thermometer Indicating Thermometer

Window Displays of the Laclede Gas Light Company, St. Louis

The accompanying photographs were taken of the window displays of the Laclede Gas Light Company of St. Louis.

S. C. Rieser, who is in charge of the Laclede window display advertising, who is also chairman of the Window Display Committee of the American Gas Association, says that the imperative need for an effective display is to have a definite objective in view while planning it.

He says further that the supreme purpose of a display is to sell the merchandise, and therefore it



"must be executed according to fixed principles and preconceived plans if the right object of all displays is to be attained to the fullest extent."

It would seem, then, that if the books show an increased number of sales of the merchandise displayed the display must be functioning. If there is no increase in sales, evidently something is radically wrong with the display.

Therefore, judging from Mr. Rieser's methods, the successful display is the one which, because of an intangible something that only study and experience can impart, instills within people a desire to buy the merchandise on display.

As The Journal Views It

THE GAS MAN'S HERITAGE

Well over the span of a century, a space of time that just about covers America's entire industrial progress and development, the gas man has been a creature who has been confronted with divers problems, many times of a most distressing nature. But by reason of some Heaven-sent dispensation, as it were, never has the difficulty been so irritating, never the task so outré, but what he has been able to encompass its solution in a wholly satisfactory manner. His, we might say with pride, is the heritage of resourcefulness, the attribute so characteristic of our national bent.

Quite obviously there is a reason for this state of affairs; an impulse, in a sense, that has quickened the ingenuity of the gas man.

In the early days of the gas industry technical knowledge, speaking in the practical sense, was not only in an unorganized condition but, of a verity, the little that was available constituted but a weak peg on which to hang a sure and trustworthy procedure under actual working conditions. Consequently the gas man had to cast about for makeshift ways of surmounting his difficulty, and certainly there were snags and difficulties a-plenty.

We can easily picture what, with the poor transportation facilities in the early days, the gas maker running out of coal and stopping up the breach with a generous supply of cord wood and rosin or whatever other carbonaceous material he could lay his hands on. We can conjure in our mind's eye the early Thespians storming across a stage of rough hewn, splintery boards, cursing roundly the dwindling supply of gas to the tin-shaded, smut-smeared footlight burners. Coming on a dog trot, perhaps fresh from a brawl at the polling booth or mayhap from a meeting of the volunteer fire department, we can see the old "gas-house terrier" finally having at the stoppage with whatever apparatus he could first happen upon. From a bagpipe to a veterinary syringe he no doubt ran the entire gamut of mechanical "persuasion" in order that the "star" might be spared his breath for a possible flight at the end of the show.

As the years crowded along gas engineering data kept pace with the technical advancement in other lines of industrial activity and the early difficulties became passé and went to weave an atmosphere of romance and tradition about our industry.

But new problems arose, obstacles of an entirely different but equally formidable sort. From the early nineties onward for a number of years various men, perhaps with a grim but misapplied sense of humor, began to sound the death knell of the gas industry. It was freely predicted that electricity would supplant gas as a lighting medium and doubtless a number of the more fatuous rushed pell-mell to unload their holdings in gas companies. Those who shouted lustily of impending calamity were partly correct but only in so far as the loss of the lighting load was concerned. We gave the better part of it up without very much blood-letting or the shedding of many tears. However, the disciples of gloom, to mention nothing of the precipitous stock unloaders, reckoned but little on the gas man's heritage—his inherent resourcefulness.

Witness the altogether astounding development of the cooking load which numerous repeated assaults have failed woefully in holding in check. Or if one would hanker after larger figures that are but in the offing we would recommend a brief consideration of the industrial load that is mounting, almost in a geometrical ratio.

And now, almost as of yesterday, comes the long-looked-for industrial research work that is at last under way. This will surely lead to a national output of gas that will stagger the imagination.

We shall encounter many problems in the future; nothing progresses without its snarls and setbacks. But we would well bear in mind that we shall always have a sufficiency of resourcefulness to handle such obstacles. Elegantly stated, we might style this attribute, the gas man's heritage, "ingenuity," but in the parlance of an age of slang it should be branded with a word whose dictionary meaning stands for one's innards.

THE STATE OF EXISTING DATA, ETC.

(Continued from page 158)

The solution is graphical, it is true, and it may be asked why not then make a graphical solution in the first place by plotting the sum of the losses per year and costs per year for a number of thicknesses and taking the low point as the economical thickness. The answer is that each solution by that or other equivalent methods requires a number of calculations, the plotting of a curve and the location of the minimum point or the point where tangents are parallel, all of which is tedious and the last step of which is likely to be highly inaccurate, while the solution described above requires but a few moments once the charts have been prepared.

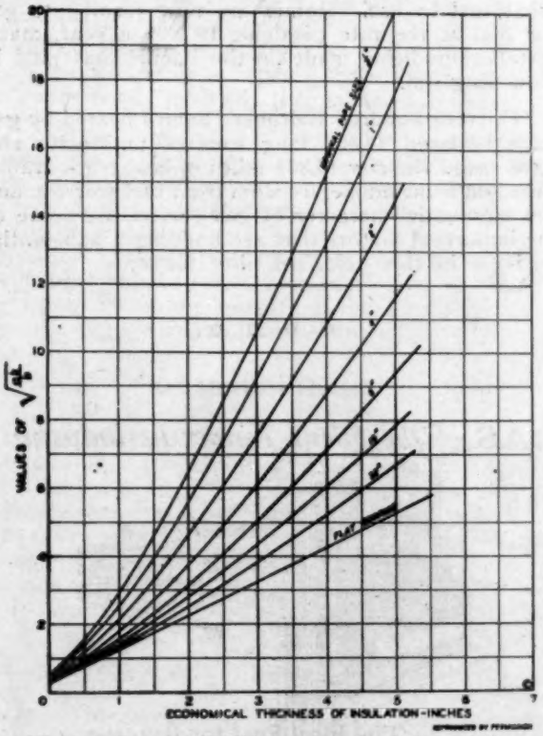


Fig. 22. Economical Thickness of Insulation on Flat and Curved Surfaces R_sK=0.3 inches.

The chart illustrated in Fig. 22 is applicable to the instant solution of most problems where a single material is involved. It is based on $R_sk = 0.3$-inch, which is fairly representative of good insulating materials under average still air conditions. Even if R_sk for the given case differs considerably from the value of 0.3-inch, the change in economical thickness will usually be so small as to be practically negligible. However, if somewhat greater accuracy is required, correction may be made by adding to the thickness given by the chart the amount in inches by which R_sk is less than 0.3-inch or subtracting from the thickness the amount by which R_sk exceeds 0.3-inch. Where absolute accuracy is required and where combinations of materials are involved, it is necessary to use a chart such as Fig. 21 for each pipe size.

6. Conclusions

It has been shown that the phase of heat transfer in which further research is most urgently needed is in the whole broad field of surface effects. In this connection it is not amiss to suggest that where the pure scientist misses the mark is that he probably feels an entirely justifiable satisfaction in being able to set up an equation which provides adequately for the effect of every variable, and the more complex the question the more keen the satisfaction, but he fails to extend his analysis a step further to the point which makes the application of the equation to actual cases conveniently useful.

This illustrates the necessity of a meeting of the minds of scientists and engineers. Usually the engineer has neither the time nor the inclination to delve into the intricacies of the underlying phenomena to an extent which enables him to establish general laws. He is too much inclined to be satisfied with the apparent relationships of the more prominent variables and to express them in an empirical fashion. Yet he has a very clear idea of the form in which the results should be expressed in order that they be most practically useful.

Bringing these extreme points of view into accord would be most profitable. For example, relatively few engineers would be much interested in having to use, for the solution of every problem involving heat transfer from surfaces, equations of the type of Equations (13), (14) and (15), to say nothing of the general equation for convection of which (14) is only a special case. On the other hand, he will use and appreciate the same data presented in the form illustrated by Fig. 15. It is true that the use of the data in such form is limited to the conditions on which the charts are based, but if the limitations are clearly stated, they will generally be heeded.

It is highly probable that with the mass of scientific data available on various phases of the subject, the combined efforts of a group of scientists and engineers could be depended upon to iron out existing contradictions and discrepancies and put the state of knowledge of heat transfer from surfaces to air in very satisfactory shape with a minimum of actual laboratory work. There is an obvious need for such further investigations dealing with fundamentals. In addition to the effects of air velocity, the effects of shape, extent, position and nature of the surface on the rate of heat transfer should be investigated and the results put in a form of convenient use.

It has been pointed out that the true significance of conductivity is not understood by many who have contributed and are contributing to the literature. So long as authors who are classed as authorities use the term conductivity loosely to apply to two or more distinctly different units, what hope is there that the layman, or even the experienced engineer who has only occasional contact with heat transfer problems, will not be confused? It is usually possible for the specialist in heat transfer to sense immediately whether the term conductivity is used in its true significance or not. If he finds that the term is used as an over-all unit including the effects of one or more conductivities and various and sundry

surface, shape and thickness effects, his respect for the authority of the article in question is likely to be in inverse proportion to the number of effects other than true conductivity which are included in the so-called "conductivity" items. It is not difficult to find abundant examples in the literature illustrating the fact that if the elementary principles of heat transfer were more thoroughly understood the state of the literature would be greatly benefited thereby.

If this paper makes any considerable headway in clarifying the meaning and use of the term conductivity, and in emphasizing the importance of a thorough understanding of surface resistance it will have been worth the effort and more. To those who have made a lifetime study of heat transfer, the treatment of the subject in this paper will appear for the most part elementary in the extreme. The presentation is elementary, and that it is such is intentional. The literature of heat transfer is expanding rapidly and it is essential that, if the current literature is to add anything of material value to the fund of knowledge on the subject, it must be based on the sound foundation of fundamental facts. It is useless to attack the more difficult problems without a clear understanding of these basic principles.

This concludes Dr. McMillan's paper.

Note—Derivation of equations (19) and (20) can be supplied on receipt of request by the American Gas Journal.

GAS RANGE AIDS CHURCH ATTENDANCE SAYS CLERGYMAN

That the use of gas in the home is doing much to stimulate church attendance is the belief of the Rev. Frederic C. Spurr, D.D., a former president of the National Free Church Council, England.

Saying that preparation of the mid-day meal keeps folks from church, Dr. Spurr suggests the use of gas ranges equipped with thermostatic control as a solution. Thus the Sunday dinner can be cooked while the cook is at church.

In making this suggestion, Dr. Spurr says he is not speaking wildly but from actual experience. His family for a long period of time regularly entrusted the gas range to cook the family's Sunday dinner while they were all at church services.

"We returned to find the meat properly cooked and the vegetables nearly ready for serving," he said. "Many of my friends adopted the same practice and, after all, in this mechanical age it would be rather remarkable if we had not eliminated or reduced the human element in our cooking risks.

"Were it not for the Sunday dinner we might more easily restore the morning as an occasion when the father, the mother and the children might attend services together as of old. The cold meal on Sunday is opposed to health and contentment and is absolutely unnecessary in these days of modern cookery."

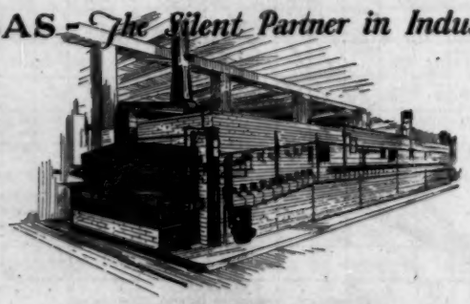
HOUSE HEATING BY GAS PROFITABLE FIELD FOR INDUSTRY, SAYS MACBETH

House heating by gas has definitely passed the experimental stage and, with the advent of insulation and an increasing number of special rates, the gas industry expects the coming year to show a record sale of gas-fired units. That is the statement of Alexander B. Macbeth, President of the American Gas Association, who is quoted by the New Jersey Public Utility Information Committee.

"Homes completely insulated can now be heated by gas at a cost no greater than that of coal," said Mr. Macbeth. "When special househeating rates are put into effect there is no longer any question as to what fuel to use. Homes are now turning to gas for fuel at the rate of about 100,000 a year, many installations being made on the Pacific coast and in New England.

"Thirteen hundred Baltimore homes heated by gas have replaced 20,000 long tons of anthracite and have saved the city 13,334 miles of coal truck traffic. Freedom from smoke, freedom from fuel worries, and the automatic character of gas service are some of the important factors that are building a substantial business in this field."—Utility News.

GAS - The Silent Partner in Industry



The Ideal Fuel for Bakeries

"Live in and Expand Your Business in Greater Pittsburgh"

Reprinted from the Business Times of March 26th, 1926

EVERY day is baking day at the bakers, and, every-day is economy day if he has adopted gas-fired ovens as his equipment.

GAS makes possible the use of automatic regulation of oven heat.

GAS provides for quick change of heat temperatures, thereby utilizing one oven for various bakes.

GAS makes possible greater quantity production without waste.

GAS results in clean ovens at all times.

GAS insures low operating costs.

It is a clean, convenient and economical fuel and these characteristics make it applicable in a similar fashion to any other industry where a clean reliable heat at low cost is required.

Our engineers are always at your service for free consultation in any commercial or industrial heating operation.

EQUITABLE GAS COMPANY

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 156

Making Oil Gas by the Jones Process

We are still considering the operation of the Jones process oil gas generator. It has been said in the previous lesson that one type of the oil gas generator is really a double generator and production of the gas is carried out in both parts of the apparatus, and the gas is finally led away through a wash box.

The oil gas installation consists of other apparatus in addition to the generator and the wash box and these are blowers, meters for measuring steam and air fed into the generator, heaters for heating the oil by live or exhaust steam before it is fed into the generator. There are also waste heat boilers and automatic controls which help materially in obtaining efficiency in the operation and also a product which is of high and uniform quality.

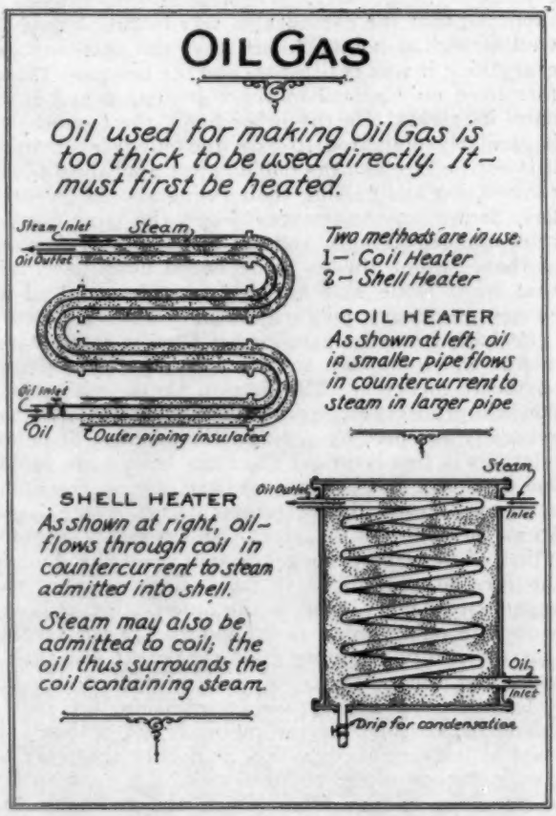
Oil Must Be Heated

It was previously mentioned that the oil which is used as fuel in the manufacture of oil gas is a heavy oil of high viscosity, one that will not flow easily at ordinary temperatures. Hence it is necessary to heat it to the proper temperature before it is sprayed into the generator. The temperature which is usually selected is 200 degrees F., but it may also be as low as 180 degrees F. according to the specific character of the oil.

There are two general types of heaters which are employed for this purpose. One of these is the coil heater. This is really a set of small diameter pipes, connected by suitable return bends one to the other, inside a set of larger diameter pipes. There is accordingly a space between the two sets of pipes. The oil is fed through the pipes of smaller diameter while steam is introduced into the larger diameter coils and thus flows through the space that exists between the two pipes. In this way the oil is heated during its entire flow through the pipe coils. Live steam is used for this purpose and it is necessary to cover the outside of the larger steam coils with asbestos or magnesia pipe covering which conserves the heat and increases the efficiency of the operation.

Shell Heater

The second type of heater is the shell type. It simply consists of an iron or steel shell into which a set of coils is built, these being made of copper or brass. The oil flows through the pipe coil while steam is admitted directly into the shell itself. Thus the oil in the pipes is surrounded with an atmosphere of steam. It is possible to use exhaust steam for heating the oil. The flow of the oil is in countercurrent to that of the steam so that most efficient heating is secured. It is also possible to vary the arrangement by having the steam flow through the coil which is surrounded on all sides by oil. This is the common type of both a heating and cooling apparatus in which a liquid is heated or cooled by means of a gas or another liquid. Both types are used for this purpose and in both cases the steam enters at the top and flows down while the oil enters at the bottom and is forced upwards through the coils or through the shell itself.


OIL GAS
Oil used for making Oil Gas is too thick to be used directly. It must first be heated.
Steam Inlet
Steam
Oil Outlet
Oil Inlet
Oil
Outer piping insulated
Two methods are in use.
1– Coil Heater
2– Shell Heater
COIL HEATER
As shown at left, oil in smaller pipe flows in countercurrent to steam in larger pipe
SHELL HEATER
As shown at right, oil flows through coil in countercurrent to steam admitted into shell.
Steam may also be admitted to coil; the oil thus surrounds the coil containing steam.
Steam
Oil Outlet
Inlet
Oil
Inlet
Drip for condensation

THE UTILITY AND THE COMMISSION

(Continued from page 161)

review. I am free to say that in some instances commissioners as well as utility managers have had to be educated as to their rights and duties, but out of it all has come a better understanding and the commissions and utilities are today co-operating in a manner which is most encouraging.

That there is a great future for the gas industry is evident from the manner in which the industry has overcome obstacles which not so long ago seemed almost insurmountable.

These obstacles have only served to bring out hidden stores of resourcefulness and determination and it must be a source of satisfaction to the industry, to your association and to your leaders to witness the manner in which you have turned obstacles into new successes.

Difficult to Satisfy Public Opinion

It is hardly necessary to state that, at the present time at least, the question of utility operation, proper rates, service, etc., is not one wherein the commissions and companies by making proper rulings on the one hand and by duly conforming to them on the other, constitute the beginning and end of success. There is more to the problem than this. All this "public relations" talk is in itself sufficient evidence of the fact. Theoretically it might be supposed that the commission was in duty bound, as well as legally bound, to see that the company got everything it was entitled to, and the company therefore need only appeal to the commission and stand upon its rights. On the other hand, the commission is similarly obligated to give the public everything it is entitled to, and the public, after appealing to the commission and getting their ruling should be satisfied. However, the soundest logic, the most correct rules and regulations, and the strictest carrying out of them cannot always be depended upon to satisfy that most fickle and hardest to understand of all elements—namely, public opinion.

Perhaps I may be pardoned if I make some statements which appear on the face of them almost obviously incorrect. The first of these, with which you will probably not agree is in connection with the generally accepted theory that the problem of public relations is simply to get the facts before the people and that once this is done, we have easy sailing. One hears and reads these statements on every hand. To my mind this is incorrect. No amount of presentation of facts or propaganda will open the door in the face of prejudice. If facts, figures, logic and argument do not prevail in the public mind, it is because the public mind is prejudiced. If we assume that the utility is giving good service at reasonable rates and the certainty of such service and rates is backed by a high grade commission, the public should be satisfied. If the public is not satisfied, it must be because of prejudice. It is only necessary to give instances where commissions have gone so far as to make rulings from which the company has appealed to the courts, and where the company has been successful in the courts and where the public is still dissatisfied, to prove conclusively that the public is still prejudiced.

Cultivation of Human Relations vs. Prejudice

There is just one thing that will prevail against prejudice—that is the cultivation of human relations, and it is along the lines of public relations that the solution will be found.

It is not within the subject of my discussion to point out the innumerable ways and means which may be legitimately employed by utilities to win over a prejudiced public, but to point out wherein there is more to the problem than simply 100 per cent perfect relationship between the utility and the commission. The confidence of the public cannot be gained or retained simply by the company "tooting its own horn," so to speak.

Commissions recognize friendly public relations as the utility's greatest asset. It will be argued that if the utility's service is adequate and the rates reasonable and non-discriminatory there can be no cause for unfriendliness on the part of the public. This is partly true, but it pre-supposes among other things, that the consumer is competent to judge correctly whether the rates are reasonable. Furthermore, in furnishing efficient service at reasonable rates, you are simply performing a duty imposed upon you by law, even in the absence of statutory provisions. Public relations, to be practical, must not be considered as a theory. It is an actual reality. Therefore, an illustration from experience would appear to be the best evidence.

A Practical Example

I have in mind the case of two utilities, one an electric company and the other a gas company, which operated in the same city under rates fixed by franchise prior to the enactment of the Public Utility Law delegating to the Railroad Commission the power to fix rates. The franchises were granted before the war and the utility law became effective in 1919. Consequently, these utilities, along with many others, sought rate increases. Adjustments were found to be necessary in the rates of both utilities, the gas rates being increased over the franchise rates by approximately 40 per cent. Since that date the electric utility has been before the commission in at least a dozen cases brought by the consumers, while not a single formal complaint has been filed against the other utility. Now, here are the interesting facts. The service rendered by the electric company was ideal while the gas service was by no means up to standard. The rates of the electric utility were, by comparison with the rates charged in other communities, very reasonable, while the gas rates appeared to be excessive. Here is a specific instance where we found prejudice or the absence of proper public relations was the controlling factor. The public had no confidence in the utility.

(Continued on page 171)

GAS MERCHANDISING

Domestic – Industrial

Ideas for the Man Who Sells

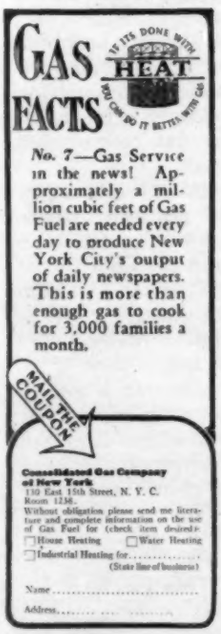
William H. Matlack

"HOW" STUFF

We do not know how others feel about it and we say this for we have heard some "catty chat" about manufacturer's salesmen being pests—be that as it may, we for one are always glad to see these travelers and we rise to remark that if rightly taken these men pass on some mighty good How Stuff.

Even if a fellow has been readin' he cannot read all there is to read about stunts that sell—too there are some good things pulled that are never written up—but don't forget that the knight with the grip gets it. When a salesman calls it's a good idea to give him a chance to tell his story—and say you can turn him down—he expects it now and then. If he sold every time he made a call he would only have to work on holidays. Let him tell you how the other fellow is fighting for the fifty per cent increase in 1925.

IMPRESSIVE INSTITUTIONAL ADS


GAS FACTS

IF ITS DONE WITH HEAT WE CAN DO IT BETTER WITH GAS

No. 7—Gas Service in the news! Approximately a million cubic feet of Gas Fuel are needed every day to produce New York City's output of daily newspapers. This is more than enough gas to cook for 3,000 families a month.

MAIL THE COUPON

Consolidated Gas Company of New York
130 East 15th Street, N. Y. C.
Room 1238.
Without obligation please send me literature and complete information on the use of Gas Fuel for (check item desired):
☐ House Heating ☐ Water Heating
☐ Industrial Heating for .....
(State line of business)
Name .....
Address .....

We have read a great many "Chats with your Gas Man" and numerous gas talks in the form of institutional advertisements—but we do not remember anything in the way of institutional advertisements—that have gotten down to facts—put the story over in an indelible impressive manner, and less space and in fewer words than the series now being run in New York newspapers by The Consolidated Gas Company of New York—one of which is reproduced on this page.

WHAT ARE YOU PAYING?
This Is After All Is Said and Done the Most Vital Question

HERE and there and everywhere there is one thing that must be settled: What are you going to pay salesmen? The sooner the question is settled the sooner the 50 per cent increase will become a reality and cease to be a bogie.

With the idea of helping the merchandising manager here and there we are offering this week a few suggestions and outlining some plans that are and have been used to compensate gas appliance and electric appliance salesmen.

Company No. 1 having a sales quota set at $150,000 for the year, serving 14,000 gas customers, with a buying territory population of 130,000. Head salesman's flat commission of 10 per cent on all sales developed and closed personally or by any member of the sales force. This man has no restrictions as to territory.

Other salesmen are paid a salary of $80 per month plus the following commissions: Two per cent on first $1,000; 3 per cent on second $1,000, and 5 per cent on all sales over $2,000.

The company has a system whereby each district salesman is required to spend one day "on the floor" and all sales made by him that day, regardless of territory, are credited to his account, save where the customer asks for a special salesman; in this case the man on the floor receives 3 per cent commission and the salesman who developed the customer receives 7 per cent.

This company has the city divided into districts, one man being assigned to each district and all

sales developed by him in his district and only such sales are used to compute his commissions.

This company pays its men $60 on the twentieth day of each month and $20 plus commissions earned on the fifth.

A young lady has charge of floor sales and receives a salary of $60 per month plus 2 per cent on all sales made direct and 1 per cent on sales developed by the district men and which are closed by her.

This company has six salesmen working in the districts, a general commercial manager, a district commercial manager, a local commercial manager and a general advertising man. The company uses regular newspaper space, the advertisements being prepared by one of the national advertising agencies, direct mail advertising and special displays in store, windows and on all company trucks.

A metropolitan gas company has the city in which it operates divided into fifteen districts and has fifteen salesmen who are paid a straight commission of 7 per cent except on ranges selling for from $50 to $80, on which they are paid a flat commission of $3.25.

Another company operating in the Middle West pays a straight commission of 10 per cent where sales are originated and completed by its salesmen and 7 per cent to the salesman and 3 per cent to the floor man where territorial man originates by when the floor man closes. Commissions apply only to such sales as the territorial man has actually called on within a period of thirty days.

A Southern company pays its salesmen a salary of $75 per month plus 5 per cent on all sales coming out of their territory, regardless of when salesman called on the prospect, while still another Southern company pays a salary of $150 per month and 5 per cent on all sales plus $2 flat for every service order turned in by the salesmen.

What Do You Think of It This Far?

There is nothing new in any of the above plans, yet one of them may hold an idea for some one regarding the vital problem of compensation of salesmen, though we must confess that only two of the plans outlined above seem to hold the men and at the same time satisfy the management. The man turnover with the first company is very high but the management seems to be satisfied. We are of the opinion, however, that they do not look at it from the proper angle, for the many men who come to them, try out the plan and go into other work do not leave with a whole lot of praise for the system, the company or its management. Just what effect, if any, this may have on favorable public opinion later on remains to be seen. It is our idea that that factor should be taken into consideration when employing men along with the cost of training men.

What Does It Cost You?

Here is a little table of costs that may interest some of you who sell. It represents the profits and losses expressed in percentages of the sales made by a group of companies, under one managment, about a year ago. In this table 100 per cent equals resale price of merchandise.

Month	Cost* of Sales Per Cent	New Business Expense Per Cent	—Per Cent— Gain	Loss
January	78½	16½	.05	....
February	92½	18	..	.10½
March	79½	23½	..	.03
April	78½	27½	..	.06
May	75	20	.05	....
June	75	25	..	....
July	76	25	..	.01
August	78	19	.03	....

* Cost of sales includes cost of merchandise, installation and delivery, etc.

¤ ¤ ¤ ¤

GAS RATES FAR BELOW GENERAL COST OF LIVING

Prior to the war the general tendency of rates on manufactured gas, such as is used in cities throughout the country, was downward. The increased cost of living occasioned by the war and the inflation which took place at that time affected gas companies equally with all other industries and made necessary some increase in rates to prevent the gas companies from becoming bankrupt. These rates, however, in no case even approached the rise which occurred in other commodities, and today, six years after the peak, they are still far below the general cost of living.

The records show that during 1917-1918, while the general cost of living was rising, the average sale price of gas actually decreased. During 1920-1921, the cost of clothing rose to 224 per cent, furniture and furnishings, 210 per cent, food 120 per cent, anthracite coal 90 per cent, rents steadily rose to more than 100 per cent above pre-war costs; taxes, likewise, steadily increased until they were 230 per cent above the level of 1913.

At the present time, anthracite coal is 97 per cent higher, food 70 per cent, rent 108 per cent, furniture and furnishings 120 per cent, clothing 60 per cent, taxes 210 per cent, and gas about 50 per cent. These averages are for the country as a whole.

This record is all the more remarkable because of the fact that the cost of many materials which are used in making gas has increased more than 100 per cent, and all other costs, including wages and taxes, are likewise far above the 1914 level.

¤ ¤ ¤ ¤

NEW ANAESTHETIC MADE FROM COAL GAS

A new anaesthetic, twice as powerful as ethylene, sure in its action and swift in permitting recovery, since full consciousness returns within a minute after the flow of gas is stopped, is science's latest invention, says "Popular Mechanics." The new anaesthetic, called propylene, is produced from ordinary manufactured gas, and besides its other feature, rarely produces any after-sickness or nausea.

THE UTILITY AND THE COMMISSION

(Continued from page 168)

Change for the Better in Recent Years

I take it for granted that we are all in accord upon the statement that recent years have witnessed a marked change in the attitude of the public toward public service companies. This being true, to what may we attribute the change? Briefly, it is because of a mutual understanding of the needs, the rights and the purposes of each, brought about through various agencies. I shall not attempt to enumerate them further than to say that it has been a process of education and cultivation in which customer ownership has no doubt been a big factor. I would also have you feel that State Commissions have contributed. I shall enlarge upon this later.

It must be remembered that until recently the average citizen, and he is in the majority, knew little or nothing about public utilities or public service companies, except he was led to believe that large dividends were regularly declared. The soapbox orators found the utility a ready target. The average citizen's conception of regulations was rate revision downward. Unfortunately, there has been an attitude on the part of some misguided public service corporations to assume a so-called "public-be-damned" policy. At times improved service or increased facilities could be obtained only when ordered by the regulatory bodies. The utility corporation came to be looked upon as an invisible octopus instead of a public servant. Fortunately there were many public service companies who at the outset recognized the value of friendly relations, and the public was taken into their confidence. Otherwise the demand for public ownership of utility property would have been more wide-spread; and the gap between the consumer and the utility would have been widened. By personal contact with the public and by the adoption of more liberal policies, prompted by an awakening interest as to what the public was thinking concerning public service corporations, the consumer has learned to a degree that instead of dealing with the soulless corporation, he is dealing with an institution owned, controlled and operated by human beings.

Human Element Must Be Considered

This suggests the thought that many of our mistakes and misunderstandings may have resulted from a failure to give proper consideration to the human element. The modern inventions which make it impossible for you to serve adequately and at reasonable rates the vast number of consumers that you do, are remarkable in themselves, but their successful operation depends upon the human element. The directors of your great corporations may adopt liberal policies designed to establish and maintain friendly public relations, but in the final analysis the directors must depend upon the local manager and his staff—who are strangely human—to carry out these policies. The legislature may enact a model law designed to place public utilities under the regulation and control of a commission. The law may be drawn with great care and may violate no constitutional inhibitions, but it is left to administrative agents—state commissioners—who likewise are human (at least we try to show some signs of human intelligence) to carry out the intent of the legislature.

There is no field today where the human element plays a greater part than in the operation of public utility property, and the progress you have made in your effort to establish friendly relations is a monument to such organizations as the American Gas Association.

What the Public Must Learn

When the public, as a whole, has learned what many of us know, that much of the capital required to construct the utility properties of the country is supplied from the sale of stock to the consumer; that the rates charged for the service rendered are fixed, or approved, by impartial regulatory bodies, such rates being based upon the fair value of the property used and useful in rendering service; that the books and records of the utility companies are open to inspection by public service commissions; that the utilities are seeking the confidence of the consumer in particular and the public in general; there will be a greater recognition by the public of the human element in public service corporations. This problem is yours. The utility, on the other hand, must appreciate more and more that it is dealing with frail humanity and that customers must not be considered wholly in the light of revenue producers.

We appreciate some of the difficulties that you will encounter. For example, as before stated, literature will in some instances be construed as propaganda. The most practical method of enlightenment, and the one which must inevitably be adopted in the interest of all persons, is the institution of a course of study in our public schools and universities, whereby a proper understanding of the functions of the regulatory bodies and public service organizations may be taught.

Certain Distinctions Necessary

The fact that such a relatively small per cent of the people recognize the distinction between the property devoted to public use, subject to regulation, and private property not subject to regulation, is further proof of the need of education. It is a common occurrence for merchants and farmers—yes, and in some cases bankers—to appear at hearings before commissions and object to the utility earning a fair return on the grounds that the farmer and merchants are not making a profit. Commissions have endeavored to enlighten the public on this point. Sometimes they have a misconception of the returns which the utilities are actually earning. I recall a case wherein the rates of a telephone company operating in a small city were under attack. The leader of the group opposing the utility was the president of the local bank, and in his testimony vigorously attacked the rate schedules. At the conclusion of his testi-

mony I asked the witness to tell us, as a banker, what he considered would be a fair rate of return for a public utility. He replied that 15 per cent would be sufficient. I then inquired whether he was referring to the banking business or the telephone business.

Great care should be taken in selecting men and women who are to deal with the public, whether it be with consumers or state commissions. No doubt there are men in the public utility field today who missed their calling. You know there are people whom you instinctively like and there are others whom you may feel that no one but a mother could love. Above all things, public utility managers should be diplomatic and should understand human nature. Whether the complaint of a customer is real or fancied, a full explanation should, if possible, be made. It is far better for the relations of a public utility that it adjust complaints with consumers rather than to permit the matter to reach a commission. Even though the commission should sustain you in your contention and you win the case, you may lose. I have heard utility men remark, after having won a lawsuit, that they had really lost because public sentiment was engendered against them. Of course, there will be litigation that cannot be prevented, but there are service complaints and other matters daily reaching the commission that could be avoided.

Work of Commission Important in Establishing Friendly Relations

State commission regulation, while generally recognized as necessary and proper, is regarded by some utilities as interference. I want to repeat that the commissions have done much toward establishing the friendly relations that exist today between the consuming public and the utility. The generally accepted view of the public is that commissions are established, primarily, to protect the rights of the consumer. As a matter of fact the commission is a quasi-judicial body whose duty it is to protect the rights of both the consumer and the utility. However, we preside at literally hundreds of cases where the public is not represented by counsel, while the case of the utility, on the other hand, is presented by an able lawyer, and at times we must almost assume the role of judge and advocate in an endeavor to have the record present the public's side of the case. Again, we hold hearings involving an important principle where it is felt that the utility did not clearly establish the facts. That is to say, the issue was not clear to the public. On such occasions, off the record, we have addressed the parties at length, frequently consuming more time than was required to try the case, recognizing, as we have learned from experience, that in the absence of prejudice the majority of the people are fair when in possession of the facts. As a general rule the public has confidence in the commission. If the reverse is true there must be something wrong in the public relations department of the commission.

FLAMING HACK-SAWS NOTABLE ACHIEVEMENT OF 1926

According to the "General Electric Review," one of the notable achievements during 1926 was the successful development of oxygen and manufactured city gas torches for the cutting of metal, superseding the more expensive acetylene or hydrogen heretofore used in combination with oxygen for this purpose. This process, described by the "Review" as "flaming hack-saws with 8,000,000 teeth per inch," bit off nine steel risers from a turbine shell in 30 minutes, each one of these risers being 19 inches in diameter. To cut these off with hacksaws or machines would be a long and expensive operation.

The use of acetylene in combination with oxygen for cutting or welding is about 25 years old. Hydrogen has also been used in place of acetylene, but both gases are extremely volatile, explosive and expensive.

The first application of this process was made with low pressure gases. Later, steel bottles were used to facilitate transportation and handling, in which these gases were compressed 2,500 pounds to the square inch. This naturally added very considerably to the expense. Manufactured city gas, on the other hand, is piped at low pressure to any convenient point of use and the cost of doing the work is very much less. The economies are particularly marked during cold weather, and the use of manufactured city gas has also resulted in a much less use of oxygen, compared with acetylene or hydrogen practice. Experience has shown that the saving in cost ranges from 30 per cent to 50 per cent, and that manufactured city gas is ideal for cutting heavy plates, risers in foundry or heavy scrap, although its economy is not so marked in cutting lighter materials.

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GAS PLANT TAR NOW HELPS THE FARM

If seed corn is coated with tar from the gas plant, crows will not dig it up and eat it. If a cordon of tar is spread around a field, the all-devouring army worm will not cross it. If gas tar is mixed with sulphur and spread, the destructive red spider of the West Indies takes his departure.

These are three recently discovered agricultural uses for gas plant tar, which has become a raw material from which more than a thousand valuable products are now produced.

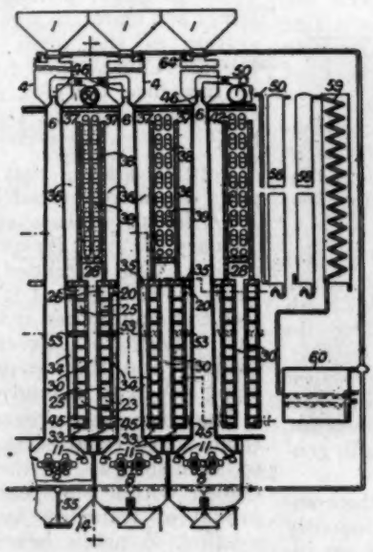
From each ton of coal used in the manufacture of gas, twelve gallons of tar form part of the by-product. Only forty years ago the slimy, black substance was considered worthless. In January, 1887, the Chemical Industry Society of London held a meeting to answer the question, "What shall we do with our tar?"

Since that time industrial chemists have developed an ever-increasing list of valuable coal tar products, varying from medicines to high explosives, from roofing to delicate perfumes, from dyes of every color to rubber compounds, and from fish-net preservatives to "clay pigeons" for trapshooters.

PROGRESS IN GAS TECHNOLOGY
Domestic and Foreign

DISTILLING CARBONACEOUS MATERIAL

THIS apparatus is for distilling coal, shale, etc., by means of superheated steam. The charge is fed from hoppers 1 to retorts 6 at a rate controlled by discharge rollers 8. Preheated gas is burnt in flues 28, and passes down through flues 30 and then up through flues 34, 36, to heat the retorts.



261,362

The gas then passes down through flues 38 containing air or gas preheating tubes 39. The volatile products pass out through ports 46 to a main 50, air-cooled condensers 56, 58, and a water-cooled condenser 59, delivering to a separating tank 60. Steam is superheated in horizontal passages 23, 25, and admitted through ports 20 to the retort. The steam may also be admitted through ports 45 to the retort to generate water gas. The upper part of the retort is of cast iron, and the lower part of chrome iron. The high temperature part is of silica or carborundum brick. Oil, gas, resin, and an absorbent coke are obtained. British Patent No. 261,362.

* * * *

SULPHUR IN SOLID FUELS

A MIXTURE of one gram of the fine powdered fuel with one gram of a mixture containing ten per cent of cobaltic oxide, sixty per cent of magnesia, and forty per cent of sodium carbonate, is heated in a porcelain boat through which a current of oxygen is passed. As soon as the reaction commences, the heat is reduced somewhat, and the gas stream continued for ten to twenty minutes after action has ceased. The issuing gases are passed through ammoniacal hydrogen peroxide to collect any trace of sulphur dioxide formed. The residue in the boat is leached with hot water, and the sulphate is determined as usual in the Eschka method. The process is also applicable to the analysis of pyrites using 0.2 gram of the mineral to two grams of the catalyst mixture. Chemicker Zeitung, 1926, volume 50, pages 673-4.

* * *

PURIFYING EFFLUENTS FROM BY-PRODUCT COKE OVEN AND GAS WORKS

AN account is given of the problems that arise in the disposal of the various effluents that are obtained in the operation of the gas works and the by-product coke oven plants. Various methods that have been employed and suggested for their treatment are discussed. The most successful is that which depends on the oxidation of the impurities, such as phenol, thiocyanates, etc., by bacterial action. The Emscher filter consists of a contact tank which is filled with clinker which is inoculated by a preliminary treatment with sewage. The diluted effluent passes down through the tank, while at the same time a current of air is blown through it.

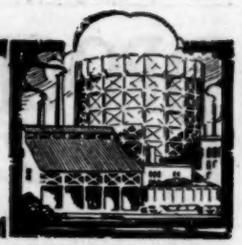
An effluent of medium phenol content requires dilution with about four times its volume of the purified effluent, containing preferably some liquid sewage. The necessary conditions for the successful operation of the plant is as follows:

In the first place it is necessary that there be a continual presence of bacteria. In the second place the effluent must possess an alkaline reaction. Then the dilution of the effluent must be just and the temperature must be controlled within certain set limits. There must also be an abundant supply of air and a certain amount of nutriment must be added for the bacteria. Details are given of a plant which has been designed for this purpose and which is in operation at the present time.

This plant reduces the phenol content of a coke oven by product effluent from 1300 to 2100 to fifteen to forty parts per million, the thiocyanate content from 100 to 160 to zero to six parts per million and the sulphur content from 300 to 4500 to ten to twenty parts per million.

For further details the reader is referred to the original article in Das Gas und Wasserfach, 1926, volume 69, pages 912-915; 932-935; 947-952.

NEWS OF THE GAS INDUSTRY



Ruud Manufacturing Co. Installs Manufacturing Plant in London, England

Following its policy of international expansion, the Ruud Manufacturing Co., makers of Ruud and Autohot Automatic Water Heaters, has founded in London, England, a factory to supply the British Isles.

With the addition of this new manufacturing unit, the Ruud Co. will have factories at these strategic points: Pittsburgh, Pa., supplying the United States and foreign countries not served by other factories; Toronto, Ont., supplying Canada; Hamburg, Germany, shipping to Germany, Holland, Denmark, Norway and Sweden, and London, England, serving the British Isles.

E. J. Horton, mechanical engineer of the company, is now in England supervising the installation of equipment. After the factory has been put on a production basis, it will be in the active charge of Edgar C. A. Bliault. Mr. Bliault has been the distributor of Ruud Water Heaters in England for some years and is fully informed on all matters relating to production and selling.

He is a Londoner by birth and educated there. His first business connection was in a shipping office in Cardiff, Wales, later joining C. A. Bliault & Co., Ltd., importers and exporters. Later he founded the British and Overseas Products Co., and it was during this association that he became the distributor of Ruud products.

Mr. Bliault is an ideal combination of factory man and sales executive and is enthusiastic about the increased opportunities that the new factory opens up.

The Ruud Manufacturing Co. was founded in 1889 by Edwin Ruud, then an engineer associated with George Westinghouse. Later the company was incorporated, but Mr. Ruud has continued as president until the present day. Other officers of the company are S. S. Robertson, vice-president, and A. P. Brill, general manager.

From a small beginning the company has expanded continuously until its products sell for the gas industry 13 billion cubic feet of gas annually. Branches are maintained in all large cities and all gas-served towns are regularly visited by traveling representatives.

Gas Company Sold

Pottsville, Pa.—The Pottsville Gas Company, one of the oldest corporations in Pennsylvania, having been in existence seventy-five years, has been purchased by the Central Public Service Company, of Chicago, for $800,000. A large number of stockholders, including many Philadelphians, realize 100 per cent on their investment. The new company will extend the gas service from Pottsville to many other towns in the Southern Schuylkill region, using the Pottsville plant as a basis.

New Gas Branch Plant on East Side Planned

St. Louis, Mo.—Application of the Illinois Power and Light Corporation for a certificate of convenience and necessity to construct and operate a gas-distribution system from Hillsboro to Litchfield will be heard by the Illinois Commerce Commission within two weeks.

The commission has announced an order which gives to the Illinois Power and Light Corporation authority to construct and operate a gas-distribution system at Fairmount City.

Brockport Gas Light Co. Files Petition For Permission to Construct and Maintain Gas Plant in Ogden

Albany, N. Y.—Brockport Gas Light Company recently filed a petition with the Public Service Commission for permission to construct and maintain a gas plant and system in the town of Ogden, Monroe County, and for approval of franchise therefor granted by the town board on December 29 last.

Petition alleges that this company was incorporated January 17, 1859, for fifty years and that on January 15, 1904, its corporate existence was extended for fifty years more and that it is authorized to manufacture and sell gas in the village of Brockport and vicinity and that steps are now being taken to extend its service.

The franchise granted by the town board requires the company to furnish gas in the town of Ogden within one year after approval of franchise by the commission. A public hearing will be held on this petition.

* * *

Only One Municipal Gas Plant in State

Kenmore, N. Y.—The unanimous vote of the trustees of the village of Kenmore, N. Y., to sell the Kenmore municipal gas system to the Republic Light, Heat and Power Company, leaves but one municipal gas business in the Empire State, at Bath.

By the sale to the private company the citizens of Kenmore will be able to purchase gas at a rate 15 per cent lower than the municipal rate, and will avoid bonding the village for $100,000 for necessary extensions of the system.

The municipal gas plant at Bath has 752 customers, and supplies approximately one one-thousandth of the manufactured gas consumed in New York State.

GEORGE EDWARD WOODS

(Feb. 15, 1870-Feb. 5, 1927)

George Edward Woods, a vice-president of the Consolidated Gas Company of New York, died Saturday night, February 5, 1927, at his residence, Twenty-first Avenue and Shore Road Boulevard, Astoria, L. I. Although Mr. Woods had not been in robust health for two years or more, his death was due to a complication of diseases. The funeral was held on Tuesday afternoon, February 8, at the Presbyterian Church of Astoria, Long Island, New York City, the Rev. James Walker officiating. The following were Mr. Wood's honorary pallbearers:

George B. Cortelyou, president of the Consolidated Gas Company; Walter R. Addicks, senior vice-president of the Consolidated Gas Company; John A. Garver, of Shearman and Sterling; Henry M. Brundage and Col. Oscar H. Fogg, vice-presidents of the Consolidated Gas Company; Lewis B. Gawtry, president of the Bank of Savings; Nicholas F. Brady, president of the New York Edison Company; T. E. Murray, first vice-president of the New York Edison Company; John W. Lieb, Harry M. Edwards and Arthur Williams, vice-presidents of the New York Edison Company; W. Greeley Hoyt, president of the Standard Gas Light Company; Eugene H. Rosenquest, president of the Westchester Lighting Company; Frank W. Smith, vice-president of the United Electric Light and Power Company; George W. Parkhurst, vice-president of the New Amsterdam Gas Company; William Cullen Morris, chief engineer of the Consolidated Gas Company; Judge William L. Ransom; H. L. Snyder, vice-president of the New York and Queens Electric Light and Power Company; William F. Kenny; Dr. W. Baldwin Wayt; Captain C. A. Boone; H. Brennon; Howard Bruce, of Bartlett, Hayward and Company; J. S. Kennedy; H. G. Scott; M. H. Spear, vice-president of the New York and Queens Gas Company; Fred White, and R. H. White.

The flags on all of the gas and electric companies' buildings in New York City are at half mast and will continue to be so displayed for thirty days.

Mr. Woods was born in Henderson, Ky., on February 15, 1870, and when a small child his parents moved to Evansville, Ind., where he attended school and incidentally laid the ground work for his career as an outstanding gas engineer by entering the employ of the Evansville Gas and Electric Company, where Isaac Baxter, an uncle of Mrs. Woods of today, was the engineer of the company. Mr. Woods was then fourteen years old. Mr. Baxter in 1889 became chief gas engineer of the Detroit (Mich.) Gas Company and took the ambitious and promising nineteen year old Woods with him.

G. E. Woods.

Mr. Woods became assistant superintendent of the Detroit Gas Company and resigned that position to become (on November 1, 1891) secretary and manager of the Pulaski Gas Light Company and the Little Rock Electric Light Company, Little Rock, Ark.

Mr. Woods saw ar advertisement in the American Gas (Light) Journal stating that the Standard Gas Light Company of the City of New York wanted a gas engineer. The advertisement had been ordered by Russell Sage, who then controlled that gas company. Mr. Woods answered the advertisement and Russell Sage telegraphed to him to come to New York and the traveling expenses would be paid. Mr. Woods made the trip and discussed the terms and position with Mr. Sage. Mr. Woods returned to Little Rock, but a few days later he received a despatch from Mr. Sage telling him to come to New York, that the position was his, Woods'.

Mr. Woods becam: assistant engineer of the Standard Gas Light Company of the City of New York on May 22, 1892, and in 1896 was made chief engineer of that company, and two years later he became the company's general superintendent. Retaining his position as chief engineer of the Standard, in March, 1901, Mr. Woods became the engineer of manufacture of the Consolidated Gas Company of New York at the request of the late Harrison E. Gawtry, the president of the latter company. Mr. Woods became assistant chief engineer and engineer of manufacture of the Consolidated Gas Company. He succeeded the late William H. Bradley as chief engineer of the Consolidated in 1922. That year Mr. Woods was elected president of the Astoria Light, Heat and Power Company, and until January, 1925, when he resigned, he was president of the Central Union Gas Company. At the time of his death Mr. Woods was consulting engineer of the New York and Queens Gas Company and the Westchester Lighting Company, and treasurer of the National Coke and Coal Company. He was elected a vice-president of the Consolidated Gas Company of New York in October, 1924. Mr. Woods figured conspicuously in the recent rate cases involving the Consolidated Gas Company and its affiliated gas companies. Much reliance was placed on the testimony of Mr. Woods who, during the trials of the rate cases, figured as one of the gas companies' principal witnesses as an expert in the manufacture and distribution of gas. Always a conscientious worker, Mr. Woods' indefatigability was shown in the months he devoted to these rate cases, when he knew no distinction between daylight and darkness—or hours in his preparation of facts and figures for court records.

Mr. Woods was a member of the American Gas Association, the Society of Gas Engineering (of which he was president for fifteen years), the old Society of Gas Lighting, the Illuminating Engineering Society, the American Society of Mechanical Engineers and several other technical organizations. Mr. Woods is survived by his widow, Mrs. Laura Wiley Woods; a son, George E. Woods, Jr., and two daughters, Miss Marion Woods and Mrs. Richard Morgan Webster, of Jackson Heights, L. I.

Bills in Indiana Senate Would Alter Scope and Status of Public Service Commission

Indianapolis, Ind.—Five bills dealing with the Indiana public service commission, the regulatory body of the state which governs the gas utilities, now are pending action in the Indiana senate. Their provisions range from the Cann bill, calling for complete abolition of the body, to the Shake bill, which merely would remove municipally-owned utilities from commission control. Friends of the commission are fighting to prevent any changes in the present utility control law.

Two of the bills have been reported favorably out of committee and the remainder are pending hearings. Other measures are in the making and if all ideas extant regarding what to do about utility regulation are to be incorporated, the number of bills will reach a score before the present session ends a month from now.

The Cann bill was the first submitted and originally called for the complete abolition of the commission and revival of the old railroad board. After a public hearing it was amended and the railroad board revival plan stricken out. Utility attorneys appeared at the hearing and pleaded for retention of the commission, but the committee reported the bill out with unanimous approval.

Another radical change in the commission is proposed in the Moorhead bill. This bill provides that the five commissioners shall be elected from the five Supreme court districts, rather than be appointed by the governor as under the present plan. The bill provides rules by which the commissioners are to be governed and declares that they must take into consideration the present market value and tax assessment value in determining worth for rate-making purposes.

A second bill by Senator Shake permits municipal plants to put their surplus earnings in the general fund of the city. This bill has been reported favorably in committee. A third bill by the same senator provides for appeal from commission decisions to the circuit or superior courts of the counties affected by the decision.

One bill yet to be introduced will broaden the commission's powers under the present organization and give it power to probe into the money expended by utilities for lawyers and lobbyists. The minority senators are preparing a bill to abolish the present commission and instead have a commission of six, three Republicans and three Democrats, named by the governor, but the appointments must have the approval of two-thirds of the senate.

Convention Calendar

February

16-18—American Gas Association. Mid-West Sales Conference of Commercial Section, Hotel Sherman, Chicago.

18-19—Kentucky Association of Public Utilities. Annual meeting, Brown Hotel, Louisville, Ky.

23-24—New England Gas Association. Annual convention, Hotel Bancroft, Worcester, Mass.

23-24—Pacific Coast Gas Association. Regional conference, Los Angeles. Clifford Johnstone, secretary, 447 Sutter Street, San Francisco, Cal.

24-25—Wisconsin Utilities Association Convention. Gas Section. Racine, Wis. John N. Cadby, secretary, Madison, Wis.

March

8-10—Oklahoma Utilities Association. Annual meeting, Huckins Hotel, Oklahoma City. E. F. McKay, manager, Oklahoma City, Okla.

17-18—Illinois Gas Association. Annual convention, Springfield. R. V. Prather, secretary, Springfield, Ill.

April

4-5—American Gas Association. Distribution Conference of Technical Section, Baltimore, Md.

6—Pennsylvania Gas Association. Annual meeting, Bellevue-Stratford Hotel, Philadelphia, Pa. G. L. Cullen, secretary-treasurer, Harrisburg, Pa.

7-8—Eastern States Gas Conference. Annual meeting, Bellevue-Stratford Hotel, Philadelphia, Pa. J. Calhoun Smith, secretary, Reading, Pa.

7-8—New Jersey Gas Association. Annual meeting, Bellevue-Stratford Hotel, Philadelphia, Pa. Louis Stoker, secretary, Newark, N. J.

19-22—Southern Gas Association. Annual meeting, Biltmore Hotel, Atlanta, Ga. J. P. Connolly, secretary, 141 Meeting Street, Charleston, S. C.

20-22—Midwest Gas Association. Annual convention, The St. Paul, St. Paul, Minn. H. R. Sterrett, secretary, 551 Seventh Street, Des Moines, Iowa.

26-29—Southwestern Public Service Association. Annual meeting, New Orleans, La. E. N. Willis, secretary, 403 Slaughter Bldg., Dallas, Texas.

The I. G. U. Contracting Co. Activities

Seattle, Wash.—The Seattle Lighting Company, of Seattle, Wash., is preparing to make extensive improvements at its plant and has awarded contract to The U. G. I. Contracting Co., of Philadelphia, to install two 9 ft. cone top sets of carburetted water gas apparatus, together with complete hydraulic operation of valves. With the apparatus will be installed two U. G. I. model B automatic controls.

To increase the capacity of the blowing plant, the U. G. I. will install two steam turbine driven blower units, each of which will have a capacity of 13,900 cu. ft. of air per minute.

Wilmington, Del.—The Wilmington (Del.) Gas Company is having installed an additional model "B" automatic control on its water gas apparatus.

Atlantic City, N. J.—The constantly increasing demands of Atlantic City consumers has made it necessary for the Atlantic City Gas Company to again increase its manufacturing capacity and it will have installed an 11 ft. U. G. I. cone top carburetted water gas apparatus which will give an additional capacity of 3500 M. cu. ft. of gas per day. The new apparatus will be equipped with U. G. I. model "B" automatic control, backrun connection, exhaust steam piping system. All valves will be hydraulically operated and the U. G. I. heavy oil nebulizing system installed.

In addition to the water gas apparatus, the U. G. I. will also install additional blast piping, overhead steel take-off main and steel connections from the apparatus to the U. G. I. waste heat boiler.

* * *

Chambers Manufacturing Co. Increases Capitalization

Shelbyville, Ind.—The Chambers Manufacturing Co., of Shelbyville, Ind., manufacturers of gas stoves and ranges, has increased its capital stock from $200,000 to $325,000, all of the increase being preferred stock.

Ruud Light Opera Hour Now on National Broadcast Co.'s Blue Network

Pittsburgh, Pa.—Lovers of light opera may now enjoy the Ruud Light Opera Hour each Monday evening at 9:30 from stations WJZ, New York, WBZ, Springfield, WBZA, Boston and KDKA, Pittsburgh. These stations are members of the new National Broadcasting Company's "blue" network.

The soprano soloist is Gladys Rice, formerly a member of the Capitol Theater Family and for a time the prima donna in "Sweethearts." Miss Rice is a daugher of the onetime vaudeville team of Sally Cohen and John C. Rice, which will be well remembered by the older generation.

Frank Munn, tenor, is a Brunswick and Victor record artist. He started out to specialize in automotive engineering but abandoned this work in favor of the concert field.

The instrumental music will be furnished by the sixteen piece Brunswick Recording Orchestra, directed by Walter Haenschen.

The Ruud Light Opera Hour is sponsored by the Ruud Manufacturing Company of Pittsburgh, Pa., makers of Ruud Automatic Gas Water Heaters.

The programs, which for three seasons have been a Monday night feature from KDKA, are now brought within reach of practically every gas served home in the eastern United States.

Stacey Manufacturing Co. Receive Awards For Contracts

St. Augustine, Fla.—The U. G. I. Contracting Company, Philadelphia, have awarded contracts to The Stacey Manufacturing Company of Cincinnati, Ohio, for the installation of a 750,000 cu. ft. capacity three lift holder at St. Augustine, Fla., and a 2,000,000 cu. ft. capacity four lift holder for Savannah, Ga. Foundations at each point are now being installed and holders will be erected in early spring.

Battle Creek, Mich.—Contract has just been awarded for the erection of a 1,500,000 cu. ft. capacity four lift holder for the Battle Creek Gas Company, Battle Creek, Mich.

St. Cloud, Minn.—The Byllesby Organization of Chicago have placed order with The Stacey Manufacturing Company of Cincinnati for the erection of a 200,000 cu. ft. capacity two lift holder for St. Cloud, Minn. Holder will be arranged for future extension with an ultimate capacity of 300,000 cu. ft.

* * *

Public Service Commission Permits Transfer of Franchise

Albany, N. Y.—The Public Service Commission has granted the petition of the Orange & Rockland Electric Co. for transfer to the Central Hudson Gas and Electric Co. of a franchise for the manufacture and sale of gas in the town of Blooming Grove, Orange County, and approved of the exercise of a franchise granted the Orange & Rockland Electric Co., granted by the town board.

UTILITY EARNINGS

Con. Gas of Baltimore

Consolidated Gas, Electric Light & Power Company of Baltimore reports for year ended December 13, 1926, net income of $5,579,609 after taxes, depreciation and other charges, equivalent after preferred dividends to $5.64 a share earned on average number of common shares outstanding. This compares with $5,444,763, or $6.41 a share on average stock in 1925.

Preliminary income account for 1926 compares as follows:

	1926	1925
Gross	$24,710,603	$22,746,142
Ex. tx. & dp.	16,579,837	14,611,054
Oper. prof.	8,130,766	8,135,088
Other income	378,614	346,066
Total income	8,509,380	8,481,154
Fixed charges	2,929,771	3,036,391
Net income	5,579,609	5,444,763
Dividends	2,955,904	2,348,900
Surplus	2,623,705	3,095,863

Laclede Gas

Laclede Gas Light Company for year ended December 31, 1926, reports net income of $1,779,552 after interest, taxes and replacement reserves, equivalent after preferred dividends to $15.46 a share earned on $10,700,000 common stock. This compares with $1,770,185, or $15.37 a share, in 1925.

Income account for 1926 compares as follows:

	1926	1925
*Gross earnings	$8,679,604	$8,278,406
Bal. for taxes	4,052,042	4,116,504
Replac res	536,283	721,283
Interest, &c.	1,736,206	1,625,036
Net income	1,779,552	1,770,185
Pfd. dividends	125,000	125,000
Com. dividends	1,070,000	1,070,000
Surplus	584,552	575,185

*Includes non-operating revenue.

* * *

First Gas Corporation Has 110th Anniversary

Baltimore, Md.—Feb. 5 was the 110th anniversary of the incorporation of the first manufacturing gas company established in the United States. On February 5, 1817, the Gas Light Co., of Baltimore, Md., came into official existence.

In 1816 the Baltimore City Council passed an ordinance permitting Rembrandt Peale, of portrait fame, to manufacture gas, lay pipes and contract for street lighting in Baltimore. The next year the company was incorporated.

International Combustion Engineering Corporation Moves to Its New Building

New York, N. Y.—With the formal occupancy of its new building, International Combustion Engineering Corporation has added one more of the large industrial corporations in the last few years to the trend uptown. International Combustion Building located on Madison Avenue between 35th and 36th Streets is the sixth largest office building in the country.

A part of the space in International Combustion Building will be used by the company in completing the design and engineering detail of its first large orders for apparatus for the distillation of coal at low temperatures, developed by Dr. Runge and Samuel McEwen and known as the McEwen-Runge process.

A half floor in the building in addition to this has been turned over to a department under the direction of Dr. Wm. L. DeBaufre one of the most eminent scientists in the country for perfecting an entirely new phase of power plant development which combines the use of pulverized coal and low temperature distillation.

Increased requirements for floor space made it necessary for the company to be sure of enough space to avoid the necessity of moving in one or two years because of continuous growth of its business, and hence the choice of a building of 600,000 square feet of area.

International Combustion Building not only has 600,000 square feet of office space, but owing to the Murray Hill restrictions it was necessary in its construction to create a veneer of apartments for nine stories on the Madison Avenue front and twenty-one of the finest apartments in the city were constructed to comply with this restriction and were rapidly rented.

With International Combustion Building being located on Madison Avenue, and at least one of the other internationally known engineering firms considering locating a building within a block thereof, and with a group of engineering, financial and architectural firms actively developing the new Engineering Building, to be close at hand, it would seem that Madison Avenue would not only become the financial center uptown but more logically perhaps the engineering center. Engineering enterprises have heretofore been scattered and there has been no really recognized location such as finance or almost any other business has had, but the trend of the engineering profession would seem now to be definitely established along Madison Avenue.

International Combustion Engineering Corporation has shown remarkable growth since its organization in 1920, and its securities have been one of the outstanding features of the leading stocks traded in on the New York Stock Exchange practically since its organization.

Its first offices consisted of one half floor of approximately 7,000 square feet in the Bowling Green Building at 11 Broadway. The rapid growth of the organization made it necessary in 1921 to build and occupy its own building consisting of eight stories and known as the Combustion Engineering Building at 43 Broad Street, where it occupied five floors or a total area of 30,000 square feet.

CITY HALL TESTS GAS REFRIGERATOR

New Ice Plant Being Examined By Public Utilities Director

Richmond, Va.—A refrigerator operated by a jet of ordinary coal gas was on exhibit in the gas and water division office in the city hall.

Director of Public Utilities George H. Whitfield put the machine on test as a part of the city's gas sales program, and many people have studied it with considerable interest.

The exhibit refrigerator is of a design not yet placed upon the market. It is operated without moving apparatus other than an automatically controlled jet of gas.

The gas, he said, boils an ammonia mixture, which in turn is cooled by a stream of water and expanded in an ice chamber similar to that of other mechanical refrigerators. The expansion produces refrigeration, and freezes ice blocks. The ammonia then is returned to the little boiling chamber through an apparatus similar to a coffee percolator, and is used again and again.

* * *

NEW GAS MACHINE BEGINS OPERATING IN COLON DIVISION

Gas Generator With Capacity of Half Million Cubic Feet Made Necessary By Community's Growth and Demand For Product

Colon.—Today marked another step in the march of progress of the Colon division of the Panama-Colon Gas Company, for its new half million foot gas generating machine was successfully put into operation.

The installation of this new gas machine and its auxiliary equipment was made necessary both on account of the community's growth as well as the increasing demand for the company's product.

R. G. Light, plant superintendent who has been in charge of the construction work in connection with the installation of this new machine, will leave in a day or two on a well-earned vacation for his home in California where he will combine both pleasure and business.